Vol. 193 83rd Year No. 3532

THE GAS JOURNAL

JANUARY 28, 1931

A Glance at the Contents—

Coal Gas and Meter Leathers.

Concluded to-day is Mr. R. S. Andrews' paper before the Australian Gas Institute on the nature and properties of certain hydrocarbons in coal gas, and their effect on meter leathers.

Annual Meeting of Aldershot Company.

The Annual Meeting of the Proprietors of the Aldershot Gas, Water, and District Lighting Company was held at Farnborough on Monday, Jan. 26—Mr. R. W. Edwards, J.P., Chairman and Managing Director, presiding.

New Showrooms at Smethwick.

Well-appointed showrooms which are being opened by Sir Arthur Duckham, G.B.E., K.C.B., at Smethwick to-day mark the completion of fifty years' gas service in Smethwick. These premises are described on a later page of this issue.

All-Gas House in Bristol.

Eighty per cent. of Bristol's cooking is done by gas—with the aid of the 90,000 gas cookers now on hire from the Bristol Gas Company. This fact was revealed by Sir George E. Davies, J.P., when he opened the Company's "all-gas" demonstration house at 71, King's Drive, Bishopston, Bristol, on Jan. 19. The premises will be open daily until Feb. 8, from 2.30 to 9 p.m.

Gas for Fish Frying.

An important meeting between fish range manufacturers and the Gas Light and Coke Company took place on Jan. 13, at the Company's premises at 146, Goswell Road, Clerkenwell, E.C. The party met at the Industrial Showrooms of the Company, where a demonstration was given by Mr. W. Dieterichs, the Manager of the Industrial Workshops, and his assistants, who illustrated the differences in the construction of fish frying pans.

Protective Coatings of Iron Pipes.

An article on a later page to-day deals with the examination of materials used for the protection of iron pipes against corrosion, which is often carried out by a method which, it is generally held, can be employed universally in the obtaining of quick and reliable information in regard to their protective properties—namely, by determining the electrical resistance. The methods, which have been published in technical literature, may not be readily available, and are therefore summarized here.

Long Service Awards to 1300 Employees.

Long Service Certificates representing 33,750 years' unbroken employment were presented last week to co-partner employees of the South Metropolitan Gas Company.

Sir Harry Lauder Visits Dundee Works.

A visit to the Dundee Gas-Works was recently made by Sir Harry Lauder. He proved a very interesting and interested visitor, and was specially enamoured with the "wee pug" engine shown in a photograph reproduced to-day and used for drawing the coke bogies from the horizontal retorts.

New Plant Inaugurated at Batley.

A notable event in the history of the Batley Corporation Gas Undertaking took place on Jan. 13, when a new gasholder and condensers, which have been installed at the works to replace plant that had been in use for more than fifty and sixty years respectively, were formally inaugurated by Alderman John Deasy, J.P., Chairman of the Gas Committee. The new plant is the latest of its kind and has been erected by Messrs. Firth Blakeley, Sons, & Co., Ltd., of Vulcan Ironworks, Church Fenton.

Petrographic Principles Applied to Coal Preparation.

In our Continental Notes to-day a translation is given of an article by K. Lehmann and E. Hoffmann in "Glückauf" 1931, 67, 1-14 (Jan. 3), who discuss the differences in the coke making properties of vitrain, clarain, durain, and fusain, and describe methods by means of which these constituents of coals may be concentrated and subsequently employed under controlled conditions for the purposes for which each is most suited. Such a separation promises technically important results for particular types of coal.

Steam Generation in Gas-Works.

Major W. Gregson deals with this question in a paper before the Midland Junior Gas Association. Surplus heat, he maintains, and not coke breeze, should be utilized for steam raising on a gas-works. We ought to see what can be done to develop the sale of coke breeze as a marketable bye-product. "Any well-run gas-works can be self-contained on waste-heat steam alone for ordinary requirements. The exception is when additional (say) chemical plant has to be dealt with over and above the normal services appertaining to the usual exhausters, pumps, power for lifts, charging, handling and conveyor plant, and—in the case of verticals—steaming."

EDITORIAL NOTES

Pushing Electricity: A Protest.

THERE is something quite familiar now in the efforts of Mr. Herbert Morrison (Minister of Transport) on behalf of electricity. His latest appeals—repeated in more than one place—for a more rapid development of the electrical industry have, however, received somewhat extensive notice in the Press, and we ourselves briefly report to-day the conference in London of 172 electrical authorities and undertakings, at which Mr. Morrison made a strong plea for the extension of electricity supplies as a means of relieving unemployment. On the last-named point we can hardly disagree with him, because in the "JOURNAL" only a week ago we advanced precisely the same argument in relation to the gas industry. Obviously the present is an opportune time for productive expenditure, and had this point stood by itself, there would have been no more to be said. But it did not; there was much more besides, and of a partisan character such as people in general hardly expect from the head of a Government Department.

More than once protests have been voiced on behalf of the gas industry against any one-sided attitude, but of these protests none has been stronger than that made at the Guildhall on Friday, when a Shoreditch gas worker complained that Mr. Morrison was using his time, energy, and Government office in the interest of one industry, which must adversely affect another. He declared that gas workers were becoming concerned that the head of a Government Department should be urging everybody to use electricity for everything. Such concern is perfectly natural, but looked at in another way we suggest that all who are engaged in the gas industry may legitimately take heart from this non-stop boosting of electricity. It seems that it may be indicative of disappointment at unexpectedly slow progress. This may, of course, be an altogether mistaken impression, but we have Mr. Morrison's own declaration that "the supply industry has barely touched the fringe of the domestic load." This, indeed, is borne out by a statement quoted a few days previously at an E.D.A. Sales Conference—to the effect that only 18 p.ct. of the houses in Great Britain are wired, and that of these not one in fifty is completely electrified. If these figures are accurate, one can easily understand Mr. Morrison's remark that, "in spite of the notable expansion of supply in recent years, they were still far from reaching saturation point."

A leader writer in the "Daily Telegraph" has espied the nigger in the fence, as is evidenced by the following quotation: "Development of the domestic consumption for power and heat, Mr. Morrison argues, will enable an undertaking to reduce the price at which industrial power supplies can be given. Therefore the encouragement by all means of the domestic use of electricity is to the benefit of industry. As a theorem this is irrefutable, but its practical application is of limited value. As a means of heating and cooking electricity has a powerful rival. That it will displace gas for these purposes no one can predict, and as a matter of national economics no one can affirm that the change is desirable. As a source of power in the household, electricity has the field to itself. But if every home used electric power for sweeping, and so forth, would consumption be much increased? The amount of power required in a small house cannot be very great, and the possible expansion of the domestic load is far from infinite." And, we would add, the capital cost would be very definite of taking steps, as Mr. Morrison urges, "-to complete distribution mains throughout all built-up areas, and to extend supplies to rural areas."

Progress of Gas: Figures from Aldershot.

THE reply of Mr. Morrison to the protesting gasworker at the Guildhall Conference included an expression of opinion that "the output of gas grew side by side with the output of electricity." This would certainly appear to be the case, judging from the report of the proceedings at the annual meeting of the Aldershot Gas, Water, and District Lighting Company, which appears on later pages of this issue. The Gas Company meeting season is now upon us, and we hope to have the opportunity of publishing other statements equally as satisfactory as that which is reproduced to-day. Aldershot has, of course, the advantage of several strings to its bow, but here it is the progress of the gas undertaking that we have mainly in view. During the past seven years the sales of gas have advanced 44·4 p.ct.; while the sales for 1930 (excluding supplies to the engines at pumping stations and generating stations), with relatively high minimum night temperatures, show a net increase of just over 2½ p.ct. With night temperatures more nearly comparable with those of 1929, the gain would certainly have been greater. There were 1002 fires fixed during the year, and 662 cookers. For the present year to date the output of gas shows an increase over the same period of 1930 of 9·5 p.ct.

The Aldershot Company is well known for its enterprising management, and the results of this are seen in all three branches of the undertaking. Electricity being the youngest, and so having most ground to cover, naturally takes the greatest strides; the sales in the last seven years having increased 459 p.ct. The area of supply is being increased continually, and this policy of widening the scope of activities in the service of the public must prove satisfactory alike to consumers and shareholders. The district over which the Company already holds powers is one in which it will be impossible to envisage "saturation point" in respect of gas, electricity, or water for generations to come.

Coke Breeze.

A SATISFACTORY feature of recent months has been the publicity given to coke breeze, and on several platforms the point has very rightly been emphasized that coke breeze is a smokeless fuel having a calorific value of 9000 to 10,000 B.Th.U. per pound—equivalent on a heat basis to approximately 80 p.ct. that of good average boiler slack—and that it is a saleable bye-product. Failure to appreciate this, and the fact that the demand for coke breeze can be cultivated, has led to much waste on many gas-works. Major W. Gregson, whose remarks are published in this issue of the "JOURNAL," is the latest to discuss the problem; and he suggests that even now the attitude on many gas-works appears to be that of "Here we have a waste product, let us get rid of it as quickly as possible;" and the boiler plant is rather looked upon as a coke-breeze destructor—which is obviously a wrong attitude. "Coke breeze," he says, "is equally adaptable for small industries on the one hand as for power stations on the other, and there is not a gas-works in this country where the district does not afford an outlet for coke breeze exploitation—provided, of course, that the matter is tackled soundly and proper advice regarding details of combustion equipment and the operation thereof is given to the consumers."

The point which Major Gregson makes is that, in most instances, there is no need for a gas-works to employ

coke breeze for steam raising, for all the steam for both power and process requirements can be generated by surplus heat from the settings—whether these be horizontal or vertical. The average gas-works needs from 800 to 1200 lbs. of steam per ton of coal carbonized, the higher figure taking into account the requirements of vertical retorts. And with regenerative horizontals 840 to 1000 lbs. of steam per ton of coal carbonized can be raised by surplus heat; while non-regenerative verticals will yield 1340 lbs. Hence, maintains Major Gregson, "any well-run gas-works can be self-contained on waste-heat steam alone for ordinary requirements." If it is not, then it is time to investigate the steam-using equipment—on which matter the author's observations are well worth noting. The very fact that coke breeze was there to be destroyed rather than burned efficiently led to extravagant use of steam—and it has led, too, to the author's statement that "in a large proportion of our gas-works a little study of existing conditions and requirements, and a little money judiciously spent, would easily effect steam economies to the extent of some 20 p.ct." His suggestion is that more attention should be paid to the concentration of power plant, to supplying prime movers with perfectly dry steam, to condensing, to the application of electricity, to the fact that low-pressure steam is as effective as high-pressure for process work, and to steam accumulator systems.

Officers as Directors.

From time to time it is our pleasure to be in a position to record the recognition of valuable and loyal service which is manifested by election of officials of gas companies to a seat at the Board of their undertaking. During the present month there have been two such instances—Mr. F. Livesey, who has been Engineer and Manager of the Maidstone Gas Company for the last nineteen years, and Mr. P. D. Walmsley, who has for twelve years been Engineer and General Manager of the Great Yarmouth Gas Company. The number of Gas Companies who have thus rewarded merit is now quite considerable, and we look forward to the time when further similar appointments can be published. Announcements of the kind are to be welcomed, not only from the point of view of the individual concerned, but because it should be in the best interests of the gas industry that companies should have the benefit of long and intimate experience of the working of their undertakings just where it can be made the utmost use of.

Gas Fires in Hotel Bedrooms.

There can be few who have not at one time or another been made to feel the comfort, or the need, of a gas fire in a hotel bedroom. Large numbers are in use, but there still remains an enormous field to be cultivated, and the distribution departments of gas undertakings doubtless have it in mind. The opportunities, of course, are not equally spread; there are frequently few wider differences between town and town than the extent and quality of the hotel accommodation. Taken in the aggregate, however, the industry is a large and influential one, and with its ever-changing patrons it possesses unique opportunities for popularizing commodities or the reverse. In hotels, where every service has to be well paid for, people are apt to be critical; they look for the greatest comfort, and this an efficient gas fire in the bedroom will give them. The sheer joy of a gas fire in one's bedroom on a chilly night or morning, when known, must be appreciated; and the hotel bedroom is a first-rate means of making it known. According to a paper read at an E.D.A. Salesmanship Conference some time ago—the subject being the lighting of British hotels—there are some 6400 hotels in Great Britain, when both luxury hotels and the humble seaside boarding-house are included; but taking only the A.A. list of hotels, there are still 2195, with some 87,251 bedrooms. Every one of these that is fitted with a gas fire is of greater benefit to the industry than that measured merely by the quantity of gas consumed. Therefore no chance of increasing the number must be allowed to slip by.

The Gas Unit.

The relationship of the therm and the electrical unit of 3412 B.Th.U. is evoking much discussion not only in this country but also in America and Australia. A recent American opinion was to the effect that the therm is too small a unit—that gas should be sold by the million B.Th.U. as distinct from the hundred thousand B.Th.U. Australian views, like those of many in Great Britain, favour a smaller unit which bears either a direct or a very close relationship to the B.o.T. Unit of current.

The suggestion made by Mr. C. E. Taylor in a paper before the Australian Gas Institute is that the gas industry in that country should dispense with the present method of stating the price of gas at so much per thousand cubic feet. "The public to-day," he said, "have little knowledge of what a cubic foot of gas or a unit of electricity is. They compare the money values only, and ten shillings looks much dearer than a penny. If we are to retain the term cubic feet, why not alter our price to so many cubic feet for a penny?" Also in a paper before the Australian Gas Institute, Mr. A. E. Hutchison, of Sydney, put forward the opinion that the industry should decide on a gas unit of a value of 3412 B.Th.U. Here are his ideas on the matter. The question of the comparison in price between electricity and gas is becoming an important factor in the competition between the two heating services. It may be thought that, because gas can give better service than electricity in many directions, the question of price is a secondary consideration. This, however, entirely disregards the psychological aspect of the matter. "We all know that gas is cheaper than electricity, but it is remarkable how many people outside the gas industry have the idea that electricity is cheaper than gas. There is a class of consumer who thinks that, because his quarterly bill for electric light is so much less than his gas bill, electricity is cheaper than gas. There are a number who cannot imagine that a commodity sold at 5s. 9d. or 6s. can be cheaper than a commodity sold at 1¼d. It seems so ridiculous on the face of it! I have had this argument put to me by builders, and when their intelligence has been appealed to by a discussion of relative heat values, they have acknowledged, with some surprise, that their ideas on the subject have been completely wrong."

Tenants and their Rights.

Allusion was made in the editorial columns of the Jan. 14 issue of the "Journal" to Press publicity in the important subject of coercion of Council House tenants in connection with the use of electricity. In many places the gas industry, besides itself being shackled with restrictive legislation, finds would-be customers also denied that freedom which in common fairness should be theirs. Some days ago the "Evening News" published a pertinent article presaging a struggle in the London County Council on this very question. From this it is learned that Mr. E. M. Dence, the Chairman of the Housing Committee, has promised a full report on the whole subject of lighting, cooking, and heating in the Council's houses and tenements.

Some Published Statistics.

While awaiting the issue of this report, it may be noted that the writer in the "Evening News" quoted the following figures as bearing upon the present position in the London County Council area: Nearly four years ago the Housing Commitee plumped for electricity for lighting and gas for cooking on the Council estates; but the rule has not been strictly interpreted. It has always been subject to local circumstances. While the new suburb St. Helier will apparently be electrically lit, the 6000 house colony at Downham has nothing but gas. In fact, 37,660 of the L.C.C. houses and tenements altogether are being lit by gas. Some 29,000 of them have been built since the war. The total number with only electric light is 11,500 or there-

abouts. Where gas is not used for lighting, it is nearly always installed for cooking or heating. Only 194 houses can be counted where electricity reigns alone. In the predominating gas areas of South London electricity has a very uphill fight still to wage, and the Council houses where it obtains entrance at all are few and far between.

Need for Individual Effort.

A timely reminder was given by Mr. Walter Holman at the annual dinner of the Incorporated Accountants Bradford and District Society, when he remarked that, in a particularly bad time like the present, there seems to be a fatal tendency for people to relax effort while they discuss the causes of the trouble and look to municipalities and governments, to anyone or anything other than themselves, to help them weather the storm. Such an attitude, he pointed out, paralyses effort and delays recovery, and he suggested to his fellow members of the Society that they could render useful service to the community by retaining their perspective and sense of proportion, and by maintaining by practice and precept that the preparation for recovery must be individual effort.

CORRESPONDENCE

Modern Gas Distribution—A Comparison with Electrical Grid Methods.

SIR,—The time is opportune for a careful consideration of the present system of distributing gas for lighting, heating, and power. During the last hundred years in this country has grown up the almost general method of distributing in large pipes at insignificantly low pressures, with all the expense of large diameter mains and the inconvenience of filling up our roadways with pipes and fittings of all kinds. These large mains, once filled with gas, are only capable of carrying a fixed amount, and therefore might be considered as being very inelastic in carrying capacity. It is true that boosting the pressures by a few inches can be, and is, resorted to, but this may be almost ruled out of usefulness when one considers the growth of population and of towns. The result is larger mains if present methods are adhered to.

One is always wiser after the event. If wrought-iron or steel mains of small diameter had been used in the first instance, of sound construction and the necessary strength, with high initial pressures of the order of 20 to 50 lbs. per sq. in., it would have been possible to-day to increase the pressures to secure the increased quantity to meet the growing demand. Of course, one would at once agree that in the very early days, when old wooden pipes only were used, the advent of the cast-iron pipe was a great advance. For some reason or other, when wrought-iron pipes became known, it was not appreciated that a change in distribution pressures should have followed as a result, and the systems gradually converted so that all future extensions could have been taken off high-pressure mains, of course leaving the old low-pressure network still in use until it required renewing.

Apparently the time has now come when the huge undertaking of the electrical grid schemes of distribution of electrical power to practically every village and hamlet in the country will compel the gas engineers to look to their laurels. It is certain that the use of gas is still in its infancy as a heating and power agent, as well as a lighting agent, if we consider it in terms of high-pressure distribution. Expert gas engineers are even now considering the problems of gas grid schemes, and in the writer's opinion, if they will only face the possibility of distribution at high pressures of (say) 50 to 100 lbs. per sq. in. with the very safe and efficient means now at their disposal, gas will take on a new lease of life. The electrical grid scheme of distribution has been made possible by cheap high voltage lines. Cheap high power lines for gas, consisting of small steel mains under high pressures, are the gas industry's remedy; and whereas the electrical engineer has to go to the expense of costly transformer sub-stations, the gas engineer has only to face the much smaller cost of high-pressure reducing stations.

"M.INST.C.E."

January, 1931.

Forthcoming Engagements.

[*Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.*]

Jan. 30.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Paper by Mr. E. W. B. Dunning, B.Sc., "Incomplete Combustion; Its Importance, Recognition, and Prevention."

Feb. 5.—MIDLAND JUNIOR GAS ASSOCIATION.—Paper by Mr. H. S. Adams (Bilston), "Erection of a New Spiral Gasholder on an Old Site."

Feb. 6.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Annual Dinner and Concert, Holborn Restaurant, W.C. 1.

Feb. 7.—MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.—Visit to the Chemical and Metallurgical Corporation, Ltd., Runcorn. Paper by a member of their Technical Staff.

Feb. 7.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Thesis by Mr. S. McGowan, Glasgow.

Feb. 7.—SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT).—Meeting and Visit to Messrs. Milne's Meters, Ltd., Edinburgh.

Feb. 10.—NATIONAL GAS COUNCIL.—Meeting of Central Executive Board, 28, Grosvenor Gardens, S.W. 1.

Feb. 12.—SOCIETY OF BRITISH GAS INDUSTRIES.—Meeting of Council in the afternoon.

Feb. 18.—Visit of JOINT JUNIOR GAS ASSOCIATIONS to the British Industries Fair, Birmingham. Meeting in the Conference Hall at 11.30 a.m. and address by Mr. Harold E. Copp.

Feb. 20.—Joint visit of B.C.G.A. GAS SALESMEN'S CIRCLES to the British Industries Fair, Birmingham.

Feb. 21.—YORKSHIRE JUNIOR GAS ASSOCIATION.—Visit to Messrs. W. C. Holmes & Co., Huddersfield.

Feb. 21.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Visit to Uddingston Gas-Works.

Feb. 27.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Paper and Films—"Holmes' & Holmes' Connersville Products."

Feb. 27.—GAS COMPANIES' PROTECTION ASSOCIATION.—Meeting of Committee, at 5, Victoria Street, S.W. 1, at 2.30 p.m.

Feb. 28.—WALES AND MONMOUTHSHIRE JUNIOR GAS ASSOCIATION.—Meeting at Cardiff. Paper by Mr. L. Cox (Cardiff), "Some Aspects of Gas Poisoning."

March 4.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Visit to Snowdown Colliery and Low-Temperature Carbonization Plant.

March 5.—MIDLAND JUNIOR GAS ASSOCIATION.—Paper by Mr. R. L. Greaves (Wolverhampton) on "Gas Dehydration."

March 7.—WESTERN JUNIOR GAS ASSOCIATION.—Meeting at Bristol.

March 7.—SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT).—Joint Meeting with Western District and Visit to Messrs. Scottish Oils, Ltd., Grangemouth.

March 7.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—See Eastern District above.

March 10.—NATIONAL GAS COUNCIL.—Meeting of Central Executive Board, 28, Grosvenor Gardens, S.W. 1.

March 18.—MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.—Joint Meeting with Yorkshire Junior Gas Association at Sheffield. Visit to Messrs. Newton Chambers, Ltd. Paper by Mr. R. Halkett, Jnr., "Explanatory Remarks with Reference to a Supply of Coke Oven Gas."

March 18.—YORKSHIRE JUNIOR GAS ASSOCIATION.—See Manchester Juniors above.

March 20.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Paper by Mr. J. G. Clark on "Gas Lighting."

March 21.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Annual Social. Address by Mr. R. E. Gibson, Vice-President of the Institution of Gas Engineers.

March 21.—MIDLAND JUNIOR GAS ASSOCIATION.—Visit to Hinckley Gas-Works.

March 21.—WALES AND MONMOUTHSHIRE JUNIOR GAS ASSOCIATION.—Visit to Tredegar. Paper by Mr. D. W. Davies, Engineer and Manager to the Tredegar Gas Undertaking.

April 10.—NORTH BRITISH ASSOCIATION OF GAS MANAGERS.—Spring meeting at Falkirk.

May 22.—SOCIETY OF BRITISH GAS INDUSTRIES.—Annual General Meeting in London, under the Presidency of the Right Hon. Lord Eustace Percy, M.P.

June 2-4.—INSTITUTION OF GAS ENGINEERS.—London Conference.

PERSONAL

Mr. P. D. WALMSLEY, B.Sc., has been appointed Managing Director with a seat on the Board, in special recognition of the services he has so efficiently rendered to the Great Yarmouth Gas Company during the twelve years he has been Engineer and General Manager.

At a meeting of the Grand Council of the Federation of British Industries on Jan. 14, it was decided to recommend that Sir ARTHUR DUCKHAM, G.B.E., K.C.B., M.Inst.C.E., should be elected Deputy President for the ensuing year, with a view to his succeeding Sir James Lithgow as President in 1932.

The Blackpool Corporation have appointed Mr. T. R. COOK, Gas Engineer at Rotherham, as Gas Engineer and Manager, in succession to Mr. J. R. Chew, who is retiring. The salary is £800 a year, rising to £950. Mr. Cook, who is 39 years of age, held appointments at Wallasey and Southport before going to Rotherham.

There was a pleasant little ceremony at the meeting of the Palatine Lodge No. 2447, of Freemasons, at the Midland Hotel, Manchester, on the evening of Jan. 16, when Mr. JOHN H. ROBY, well-known in gas circles for 25 years as the Manchester and District Representative of Messrs. Willey & Co., Ltd., and the Vulcan Stove Company, Ltd., of Exeter and Manchester, was specially honoured by his fellow-members. He has been a member of this Lodge for 37 years, and was Worshipful Master 29 years ago. It was deemed fitting, therefore, that at the Installation the other evening of Bro. E. Kaylor, a presentation should be made to Bro. Roby, as Father of the Lodge. The presentation consisted of a solid silver cigar and cigarette casket, suitably inscribed to mark the affectionate regard in which he is so deservedly held by his brethren.

OBITUARY

The deepest sympathy will be felt throughout the gas industry with Mr. FREDERICK D. MARSHALL, of Millers Point, Weybridge, in the irreparable loss he has sustained by the death on Jan. 19, after a short illness, of his wife Annie. Mrs. Marshall was the sister of Mr. Thomas Goulden, formerly Chief Engineer, and now a Director, of the Gas Light and Coke Company. There remain some who will recall with pleasure the kindly way in which she acted as hostess to them when, in 1899, under the Presidency of Mr. Marshall, the Incorporated Institution of Gas Engineers were the guests of the Danish Gas Company in Copenhagen. Mr. Marshall has enjoyed a long and distinguished career in the gas industry, throughout which he has had the unfailing aid of the wisdom and sterling qualities of the wife whose loss he now mourns. That she possessed in abundance this wisdom and these sterling qualities those who had the privilege of meeting her in private life are aware.

The death has occurred at the age of 77 of Mr. ANDREW LAING, C.B.E., a Director of the Newcastle-upon-Tyne and Gateshead Gas Company, who joined the Board after the Walker and Wallsend Gas Company was taken over some years ago by the Newcastle and Gateshead Company. Mr. Laing had been a Director of the Walker and Wallsend Gas Company for many years. He was a marine engineer, and was responsible for the machinery of the "Mauretania" and many well-known liners and battleships. He was Managing Director of the Wallsend Shipway and Engineering Company, Ltd., and a Director of Messrs. Swan, Hunter, & Wigham Richardson, Ltd., of Wallsend.

The death occurred on Jan. 24 of Mr. GEORGE HAY MORGAN, K.C., in London, within a few days of his 65th birthday. Mr. Morgan was Liberal member for the Truro-Helston Division of Gloucestershire from 1906 to 1918, and had been for many years a Director of the Tottenham and District Gas Company. As late as October, 1928, Mr. Morgan was initiated into the Evening Star Lodge, No. 1719, and his genial personality will be sadly missed by all the brethren.

The death took place last week of Mr. ALEXANDER C. WATSON, late Gas Manager, Newton-Stewart. Mr. Watson, who was aged eighty, held the position for over twenty years, and was instrumental in bringing about many improvements to the gas-works.

We learn that Mr. JOHN G. ALLOTT, of 25, Cowlersley Lane, Huddersfield, who has represented Messrs. Geo. Bray & Co., Ltd., for more than 30 years, died suddenly on Jan. 24. Mr. Allott was 70 years of age.

On Sunday, the 25th inst., the death took place of Mr. A. B. CONSTANTINE, Chairman of the Stourport Gas Company. He was 70 years of age, and had been Chairman continuously since 1915. He has always been an active member and supporter of the National Gas Council.

The Late Herr Lux.

We have received an interesting communication from a correspondent who was an old friend of the late Herr Lux, the eminent German chemist of Ludwigshafen-am-Rhein, well known as the inventor of the chemical balance which bears his name. The apparatus was designed and made for the automatic determination of the specific gravity and composition of gas. Herr Lux described and illustrated it in two papers which he read before the old Gas Institute in the years 1887 and 1888. During the discussion on the first paper, Herr Lux acknowledged that twelve years previously Mr. John Somerville, of the South Metropolitan Gas Company, had constructed an apparatus very similar to his own.

An obituary notice relating to Herr Lux appeared in the "JOURNAL" for April 30, 1930 (p. 139). Our correspondent has recently received from the widow, Frau Luise Lux, a photograph, which is reproduced here, of a beautifully executed memorial bust lately unveiled in the Friedrichsruhe Gardens of Ludwigshafen, where the deceased lived for many years, and where his manufactories are situated. The Gardens are not far from his place of burial.

THE NEWS OF THE WEEK

At Peel, I.O.M., a new gasholder is in course of erection, and ground has been selected for building a showroom.

A New Gasholder has recently been erected at Ramsey. During the last twelve years, Ramsey has more than doubled its output of gas.

New Offices in Fairfield Street, Wandsworth, it is understood, are to be erected shortly by the Wandsworth, Wimbledon, and Epsom District Gas Company, the plans having been passed by the Borough Council.

British Tar Spirit, Ltd., has been registered as a Private Company to acquire certain inventions relating to the generation of gas from liquid hydrocarbons and the production of hydrocarbons of low-boiling point. Nominal capital, £100,000.

The Tottenham and District Gas Company recommend the payment of dividends in respect of the half-year ended Dec. 31, 1930, at the rate of 5½ p.ct. and 5 p.ct. per annum respectively on the preference stocks; and £6 12s. 6d. p.ct. per annum on the ordinary stock; all less income-tax.

The New Gasholder for the Newcastle-upon-Tyne and Gateshead Gas Company, at Howdon-on-Tyne, will be completed, it is expected, in six months. The structure was commenced a year ago, and it was then estimated to provide work for 12 months, but a longer time was spent on the laying of the foundations than was anticipated. On the completion of the holder another 3 million c.ft. of gas will be available to meet the developing needs of the district.

Coal Hydrogenation.—It is understood that the laboratory for carrying out large-scale experiments on hydrogenation of coal established at Duisburg by the A. G. für Steinkohleverflüssigung und Veredelung has been closed owing to the want of suitable materials for the parts of the plant exposed to very high pressures, which were very quickly worn out. The same trouble has prompted the I.G. Farbenindustrie to curtail considerably its activity in the field of hydrogenation of coal.

A Gross Profit of £20,930 is shown by the annual report of the Burton-on-Trent municipal gas undertaking for the past year. This is an increase of £8503 over the previous year; but the loan and special charges amounted to £24,542, making a net deficit of £3612, which is less than that of last year by £8692. After making contributions to the cost of extensions, the total deficit carried forward is £11,327. The sales of gas increased by £1000, the income from residuals decreased by £1700, and the working expenses dropped by £9200.

The Change of Frequency of the electrical current in Glasgow from 25 cycles to 50 cycles necessitates the changing of all the present motors at the Provan Gas-Works. The Central Electricity Board are bearing the entire cost of replacing the old 25-cycle motors with new 50-cycle motors of similar design; but owing to a large proportion of failures taking place among certain types of motors, the General Manager of the Gas Department proposes that these types be eliminated and replaced by totally enclosed motors, the Department paying the difference in cost between the types of motors displaced and those installed. The Committee have approved this scheme, and the General Manager has been authorized to place the orders for the new motors with the General Manager of the Electricity Department.

Dr. C. M. Walter Lectures in Halifax.

Dr. C. M. Walter, of Birmingham, who has been engaged by the Halifax Corporation as an expert adviser to the Gas Committee and local consumers on the subject of gas for industrial uses, opened his campaign so far as concerns the public by a lecture, on Jan. 21, at the St. Marie's Assembly Rooms, when he spoke on and demonstrated the value of gas for industrial heating. Ald. J. H. Waddington (Chairman of the Gas Committee) presided and was supported by several members of the Committee and Mr. W. B. McLusky, Gas Engineer and Manager.

Ald. Waddington, introducing the lecturer, said he would be the last person to claim that gas should be the only system of lighting, but when it came to heating there was no fuel that could compare with gas in efficiency, cheapness, and service.

Dr. Walter, in the course of his talk, said industrial users of fuel and heating in Halifax were especially fortunate in the fact that their town had cheap gas. He understood that the Halifax Gas Undertaking had arranged for an industrial heating showroom to be equipped with modern types of apparatus, where local manufacturers would be able to test various forms of gas-heated furnaces and other heating equipment under practical conditions. The lecturer showed slides illustrating different types of industrial heating appliances in use, and in conclusion said the idea that gas and electricity were opposing forces was quite wrong. They were complementary services, and each had its own future and its own field of application.

The Gas Light and Coke Company's Dividends.

The accounts of the Company for the past year show that the balance to the credit of the net revenue account will enable the Directors to recommend the payment of dividends for the half-year to Dec. 31 last as follows:

	£	s.	d.	
On the 4 p.ct. consolidated preference stock at the rate of	4	0	0	p.ct. per annum
On the 3½ p.ct. maximum stock at the rate of	3	10	0	,, ,, ,,
On the ordinary stock at the rate of	5	12	0	,, ,, ,,

carrying forward to the next account the sum of £122,055 7s. 7d.

London Electricity Conference.

Gasworker's Protest.

There was an interesting, and in some respects amusing, interlude at the Conference of electricity supply authorities in the southern area and the Minister of Transport (Mr. Herbert Morrison), which was held at the Guildhall, London, on Friday, Jan. 23. The object of the Conference, following similar Conferences in the Provinces, was to urge electricity supply authorities to endeavour to develop the sale of electricity with greater rapidity than is sometimes the case. Mr. Morrison, who said he lived in an "all-electric" house, pointed out several directions in which more rapid progress might be secured, and indicated means by which the Government was willing to help.

When the time came for the general discussion upon the Minister of Transport's speech, a speaker at once rose in a quite orderly manner who gave the name of Mr. J. Reid, and stated that he had been a gasworker for 18 years in Shoreditch. He said that gasworkers were becoming concerned, if not alarmed, at the speeches which were being made by a Member of the Government all over the country practically advising everybody to use electricity for everything. The gas industry has played, and is playing, he continued—and if given fair play would continue to do so—a great part in the problem of the utilization of coal, light, heat, and power, and living under the competitive conditions of to-day there could be no complaint on the part of the gas industry if a competing industry—electricity—made progress and gas could not hold its own on its merits. But when the head of an important Government Department used his ability, energy, time, and position to further the interests of one competing industry against the other, there must be an adverse effect upon that other industry. He himself was concerned because the gasworkers would suffer as a result of what was being done, and he urged the Minister of Transport to consider this aspect of the question, and make quite sure that in asking the electricity industry to find more employment he would not be throwing out of employment men who were at present in constant employment and

would continue to be so if the gas industry was given a fair chance. That was all they asked.

A Labour Councillor from Shoreditch soon afterwards took pains to assure the Conference that Mr. Reid was not a member of the Shoreditch Borough Council, and, therefore, had no right to be at the Conference. This caused some amusement, and the question went round, "How did he get in?" As a matter of fact, although primarily it was a Conference of electricity supply authorities no tickets were required, and it was open to anybody who might have been aware of the Conference, to walk in without challenge.

Mr. Herbert Morrison, replying later and dealing with this point, said he was sorry, but it was his duty to further and to help the industry for which he was politically answerable, so far as he could, if it were in the interests of the nation that he should do so. At the same time, he would not agree with the suggestion of Mr. Reid that the gas industry was being adversely affected by the progress that was being made in the electricity industry. All the facts went to show that the gas industry was progressing side by side with the electricity industry, and that it had been fairly clever in holding its own.

Among those present at the Conference was Mr. H. C. Smith, of the Tottenham and District Gas Company.

Mr. R. W. Edwards on the Work of the Association of British Chambers of Commerce.

Submitting the toast of "The Association of British Chambers of Commerce" at the revival of the Annual Dinner of the Aldershot and District Chamber of Commerce on Jan. 20, the Mayor (Councillor R. W. Edwards, J.P.) paid tribute to the far-reaching character of the work of the Association.

There was no restriction, he said, on what problems were brought forward, and the Executive was supposed to be able, if not to find a solution to a problem, to find some sort of salve. This combination of Chambers of Commerce throughout the country, meeting from time to time and exchanging views, assisted towns of the character of Aldershot, and enabled individual business men to broaden their minds.

If a man was to succeed in business to-day he must take the fences as they came, and take them with a certain amount of sport and confidence, and not only that, but they must be prepared for the short ride and the long ride, and to take pleasure at the end of the day in knowing that they had overcome difficulties.

If ever there was a time within his memory when business men must practise resourcefulness, enterprise, and mobility—the words were synonymous—it was to-day. They must not think as men of towns, but as members of one big Chamber of Commerce, which was called the British Empire, and their duty was to help to advance that great Chamber of Commerce to such success that it would overcome rightly, fairly, and squarely all other competitors in the world, and find for our people that happiness and success which were so necessary, not only in business but out of business, and make our land what we are trying to make it.

Society of British Gas Industries.

A meeting of the Council was held at 56, Victoria Street, S.W. 1, on Jan. 20—Mr. FRANK WEST, Chairman, presiding. Those present were: Dr. E. W. Smith, Col. E. A. Wilson, Messrs. W. J. D. Howell, H. E. Bennet, H. M. Thornton, L. Hartley, B. B. Waller, F. J. Gould (Hon. Treasurer), E. J. Davison (Hon. Secretary), and Arthur L. Griffith (Secretary). Apologies for absence were reported from Messrs. D. M. Gibb (Vice-Chairman), C. A. Goodall, R. B. Hodgson, R. J. Milbourne, W. H. Handley, F. C. Tilley, T. O. Wilton, and Ernest West.

The Chairman referred in feeling terms to the death of Lord Melchett, one of the Past-Presidents of the Society and a distinguished leader of industry, and the members rose in their places as a mark of respect.

A letter of sympathy had been sent to Lady Melchett, also a wreath for the funeral, and the Secretary represented the Society at the Memorial Service.

A donation of two guineas was voted to the Commercial Education Fund of the London Chamber of Commerce. Good progress was reported in connection with the Inquiry Bureau at the Gas Industries Section of the British Industries Fair, Birmingham.

The Annual General Meeting was fixed for May 22 in London under the Presidency of the Right Hon. Lord Eustace Percy, M.P.

The Industry to Visit the Fair.

JUNIOR ASSOCIATIONS' DAY.

Full facilities are offered once again this year for members of the Gas Industry to visit the British Industries Fair at Birmingham next month.

On Wednesday, Feb. 18, the Junior Gas Association will gather at Birmingham, and the Fair Authorities have very kindly extended an invitation to luncheon to members. In the morning a meeting of the Junior Associations will be held in the Conference Hall, which adjoins the Gas Section, at 11.30, when an address will be given by Mr. Harold E. Copp, President of the Institution of Gas Engineers. Luncheon will be served in the Bradford Rooms, adjoining the Conference Hall, at 1 p.m., after which members will be at liberty to visit the Exhibition.

SALESMEN'S VISIT.

On Friday, Feb. 20, the British Commercial Gas Association are organizing an official visit of members of the Gas Salesmen's Circles to the Fair, but, in order that the utmost amount of time may be spent in inspecting the Gas Industries Section, no formal meeting is to be included in the day's programme. The Fair Management Committee are here again co-operating with the British Commercial Gas Association in the arrangements for the day by providing luncheon and issuing tickets of admission to the Fair.

Cheap travel facilities have again been arranged for members taking part in these visits.

How Gas Serves the Public.

The services rendered to the public by the gas industry were described by Mr. C. S. Shapley, Engineer and General Manager to the Leeds Corporation Gas Department, at a luncheon held last week at Fenton Street Drill Hall, Leeds, in connection with the Building Trades Exhibition promoted by "The Yorkshire Post" in conjunction with Provincial Exhibitions, Ltd.

Mr. Shapley said that during the last twelve months the number of appliances sent out from the Leeds Department included 4768 cookers, 2389 fires and radiators, 14,397 meters, 1644 water appliances, 170 racks and stands, 4589 grillers and hotplates, 5074 lighting fittings, 2255 oven conversions, and 555 set-pot conversions.

Mr. Shapley stressed the importance of the coke fire as a means of fighting the smoke evil, and explained the steps that had been taken to re-condition the Leeds works. With regard to new property, a good many houses were simply allocated one or two gas points—a wash-boiler and cooker—and he would suggest to builders that points might be installed upstairs or in other rooms before the floor boards were put down. This would obviate much trouble and inconvenience, and would enhance the value of the house that could have the service on tap if required.

One of the gas industry's greatest troubles was that consumers would not complain. They had 120,000 consumers in Leeds and they did not receive 50 complaints a day. As an industry they had to realize an important point—namely, that the consumer could endure a bad supply of gas. It was impossible to endure a bad supply of electricity. It was all or nothing there. The Gas Department stood ready for complaints, reports of escapes and so forth. It invited co-operation, and if the Department was given an opportunity, it would endeavour to give the best possible service.

Gas *versus* Electricity.

Under this heading, Mr. J. E. Lister Cooper, of Yeadon, the Secretary of the Yorkshire Commercial Section of the Manchester District Institution of Gas Engineers, referred in a letter to the "Yorkshire Post" to Mr. C. S. Shapley's remarks in connection with the "Yorkshire Post" Building Trades Exhibition now being held in the Fenton Street Drill Hall, Leeds.

Having congratulated the "Yorkshire Post" on their enterprise, Mr. Lister Cooper went on to say that the gas industry has, as Mr. Arthur Hayday, M.P., has said, made possible, at a price the poorest can afford to pay, what the "advocates of electricity for all" merely promise. It has done this without "State aid," and, in spite of antiquated and restricted legislation, continues to grow, and will continue to do so provided it is accorded fair play.

Compare this record with that of electricity as is indicated in the report of the visit of the Minister of Transport to Manchester. Here is a paid Minister of the Crown going about the country, first in one city, then another,

THE NEWS—*continued.*

performing what may be described as duties approximating to those of a commercial traveller to stimulate the activities of the electricity undertakings, a State-aided industry which employs little labour and uses materials practically the whole of which are of foreign manufacture or origin (with the exception of coal); thereby British capital is spent abroad, when it would otherwise be available to provide employment in this country. Where are they to obtain this business from? As the building of new houses is now slowing down and trade is depressed, obviously if the electrical industry is to obtain an appreciable amount of new business it can only react to the detriment of the gas industry and cause further unemployment.

Are all the services rendered by the gas industry to count for nothing, and the 120,000 workers engaged in that industry, and the many thousands employed in allied trades to be thrown out of employment, in order that electricity may attempt to render the same services, at greater cost, with a large waste of coal and valuable chemical products and a smaller amount of labour? What is required is a true sense of proportion, and no running after what may easily prove to be a "Will o' the wisp."

Long Service Awards to 1300 Employees.

Long Service Certificates representing 33,750 years' unbroken employment were presented last week to co-partner employees of the South Metropolitan Gas Company.

Over thirteen hundred workers who have completed twenty-five years' service with the Company in the production of South London's gas supply are receiving these official certificates, which have been personally autographed by the President, Dr. Charles Carpenter, in recognition of their faithful service.

Each certificate is beautifully illuminated with scenes of old London, the arms of the South Metropolitan Gas Company, and the crests of the ten Boroughs in which the Company operates.

Triumph for Gas at Bradford.

For a good many weeks past there has been in progress at Canterbury Avenue, a wide new Bradford roadway, a comparative test of lighting efficiency combined with cost between gas and electricity, and the matter has been under the consideration of a special Sub-Commitee, whose findings, it has been generally understood, are likely to settle the long controversy as to whether Bradford's street gas lighting shall be superseded by electricity or not. Some considerable time ago the lighting on all tramway routes was changed over to electricity, the current being conveniently carried along the tramway standards. The electrical side have been hankering for the lighting of other main roads—especially in view of the fact that there is a tendency gradually to replace tramway routes by trackless trolley vehicle services of motor buses.

The Special Committee, on Jan. 22, after an exhaustive examination of all the points for and against both systems, decided that, light for light, and price for price, gas has the advantage, as applied in the modern lighting equipment used in the experiment and which, it is now recommended, should be applied to all the principal roads on which trams do not run.

The decision has to be ratified by the City Council, and there is, of course, the possibility of the recommendation being rejected there by vote of electrical partisans; but it is generally believed that the Corporation will accept the verdict of the Committee which was appointed specially to deal with the problem. Bradford's street lighting bill is a big one, the estimated expenditure for the present financial year being £80,000 for gas lighting and £20,160 for electric lighting—a total of £100,160, equivalent to a rate of about 11d. in the pound.

Employees Entertained at Cheltenham.

Two hundred employees of the Cheltenham Gas Company were entertained at dinner by the Directors on Jan. 8. Proposing success to the Company, Mr. L. E. Twycross, Chief Engineer, who presided, remarked that during the year which has just passed new records had been made by the undertaking in the output of gas, in the miles of additional mains laid, and in the number of consumers connected. What was a source of intense gratification to them all was that the forward policy adopted by the Directors had been the means of contributing very largely to the alleviation of the curse of local unemployment. They had been able to find work for quite a small army of men for a considerable period.

Mr. S. G. Wood, Chairman of Directors, in the course of his reply explained that the Cheltenham Gas Company paid in rates and taxes every week £230, or nearly £12,000 in a year. That was a first charge on the business. With that £230 a week they could employ 80 or more men and lay another twelve miles of mains, and at the same time reduce the price of gas by a penny per therm, with the result that they would sell more gas and employ still more men.

The Directors present, in addition to Mr. Wood, were Mr. H. A. Thomas and Mr. A. H. Wyatt, with Mr. C. W. Welford (Commercial Manager).

City and Guilds of London Institute.

Department of Technology Report.

The Report of the Department of Technology of the City and Guilds of London Institute for the session 1929-30 has just been published, and it is satisfactory to note that, as compared with last year, the number of candidates examined in technological subjects in Great Britain and Ireland shows an increase of approximately 9 p.ct., the figures for 1929 and 1930 being respectively 13,543 and 14,721. Still more satisfactory is the fact that the subjects in which the increases have mainly taken place are headed by Gas Fitting for Grades I. and II., of which the entries, following a rise last year, again increased from 690 to 911.

The following figures show the results in the various gas subjects:

Subject.	Total No. of Candidates.	Prelim., Grade I., Grade II., Inter., or Final.	No. of Candidates.	Results. 1st.	2nd.	Pass	Fail.	Percentage of Failures.
Minor course in gas-works practice .	6	..	6	1	3	..	2	33·3
Minor course in gas-supply practice .	104	..	104	24	52	..	28	26·9
Gas fitting . . .	1039	I.	515	..	..	380	135	26·2
		II.	396	168	122	..	106	26·7
		F.	128	47	64	..	17	13·2

The Examiners in these subjects were: Gas-Works Practice, Mr. H. C. Smith; Gas Supply Practice, Mr. E. F. Keable; and Gas Fitting, Mr. W. Dieterichs.

Under the list of winners of special prizes offered by trade societies and other bodies, the following awards were made by the Society of British Gas Industries:

Minor Course in Gas-Works Practice.—1st Prize, £5 5s., Athol Brown, Edinburgh. No candidate reached a sufficiently high standard to justify the award of the 2nd Prize.

Minor Course in Gas Supply Practice.—1st Prize, £5 5s., Norman Ernest Ellis Denman, L.C.C. Westminster Technical Institute; 2nd Prize, £2 2s., William John Kibble, L.C.C. Westminster Technical Institute.

Gas Fitting.—Final Examination.—1st Prize, £5 5s., John Henry Coulson, Technical College, Derby; 2nd Prize, £2 2s., Harold Banks, Central Technical College, Birmingham.

Mr. John Bond Lectures on the Southport Undertaking.

Mr. John Bond, Engineer and Manager of the Southport Corporation Gas Estate, gave a lecture on the gas-works at a meeting of the Chamber of Trade on Jan. 22. The lecture was one of a series given by head officials of the Corporation on the subject of "How Southport is Governed."

The lecture was illustrated by a series of slides, and Mr. Bond dealt with the progress made in manufacturing plant and described in detail the plant at the Southport Works. In a reference to the Southport Works, he mentioned that it was in 1850 that the then local governing authority built gas-works in Eastbank Street at a cost of £3500. The first year's supply was practically half-a-million c.ft. of gas. They supplied 300,000 c.ft. to 69 consumers, and the remainder was used for street lighting. To-day the works supplied in one hour exactly the same amount of gas that those consumers took in a year. The works were later removed to the boundary of the Borough at Crowlands, where the land presented difficulties for building. They had several feet of sand, and below that a bed of peat, and they had to go a considerable depth to reach solid clay. This meant driving piles made of reinforced concrete into the ground by a steam hammer.

Illustrating the growth of the works by stages of ten years, Mr. Bond said by 1860 the annual output of gas was

11 million c.ft. In 1870, the figure was 49 million c.ft. In 1872 the works were removed to Crowlands. In 1880 the output was 144 million c.ft.; in 1890, 243 millions; 1900, 396 millions; 1910, 515 millions; 1920, 581 millions; and in 1930, 800 millions. The capital outstanding in 1930 was £256,000.

Councillor Fred Scott (Chairman of the Gas Committee) said he knew that in the time placed at his disposal Mr. Bond had not had an opportunity of going very fully and deeply into every phase of the subject, and he was of the opinion that although the lecture had been particularly lucid, the audience could not fully appreciate the care and attention which was taken towards the efficiency of the Estate until they had actually paid a visit to the works, and seen for themselves the many labour-saving devices and different systems in operation which rendered the Southport Gas Undertaking so up-to-date and successful. The Gas Committee were ever alive to the importance of excellent service to the users of gas, and in Mr. Bond they were confident they had an Engineer who had given his best, and when in due course they would have to lose his services (because of superannuation age) he was sure Mr. Bond would leave the undertaking in a highly satisfactory and efficient condition.

The President (Mr. C. F. Chinnery) moved a vote of thanks to Mr. Bond.

Mr. Bond, in reply, said it was a pleasure to do anything to further interest of the citizens of Southport in those works which belonged to them. It was always the desire of the Estate to render efficient service.

All-Gas Demonstration House in Bristol.

Eighty per cent. of Bristol's cooking is done by gas—with the aid of the 90,000 gas cookers now on hire from the Bristol Gas Company. This interesting fact was revealed by Sir George E. Davies, J.P., when he opened the Company's " all-gas " demonstration house at 71, King's Drive, Bishopston, Bristol, on Jan. 19.

Bristol housewives thronged this fascinating house to inspect its complete equipment of modern labour-saving gas appliances. The premises will be open daily until Feb. 8, from 2.30 to 9 p.m.

The house itself is full of interest. It is a thoroughly up-to-date residence, erected by Messrs. Filer Bros., and tastefully furnished by Bobby's, of Clifton. Every room is handsomely fitted with the latest gas devices for lighting, heating, and general comfort and convenience by the Bristol Gas Company, and Bristol housewives and others are cordially invited by the Company to call and inspect the house at their leisure.

Heating is by gas fires, with a gas radiator in the hall, and lighting in every room is by pendant, bracket, or stand lamps, all of which are artistically designed, adding dignity and distinction to the house.

A gas iron is provided in the kitchen, and the scullery is fitted with the latest type of gas cooker, and a gas washboiler. There is a curling iron heater provided in the front bedroom, and a curling iron bracket in an adjoining bedroom. An additional ironing set, together with a boiling burner on a high stand, are provided in the nursery. Alternative systems of hot water supply will be fully explained to interested visitors. The garage is provided with a safety lamp, and also with a special heater.

Many users of gas as well as prospective users who visit the all-gas house will doubtless inquire about the new system of thoroughly modernizing gas lighting by fitting gas switches to all lights.

Newcastle-upon-Tyne Commercially Considered.

The Activities of Gas in the Area.

The Corporation of Newcastle-upon-Tyne have published an attractive handbook with a view to encouraging new industries to their city.

It is stated in the foreword that there is still room for many new works and factories in the whole of the area comprised by the designation " Tyneside," which extends from South Shields to Hexham and back to Tynemouth. Naturally, the seeker after a factory site will ask what is the secret of the success of Tyneside, or more particularly the capital of that area, the City and County of Newcastle-upon-Tyne, and to answer him correctly and lucidly it will be necessary to ask him to read and digest the contents of this Brochure.

It is fully appreciated what an important part gas plays in industry, and a comprehensive section is devoted to the service rendered by the Newcastle-upon-Tyne and Gateshead Gas Company in this area. Gas is, undoubtedly, the factory fuel, it is stated, and heat is a much more important factor than power, because users of heat are realizing more and more that fuel cost accounting must be something more than the bare cost of the fuel. The many advantages of gas for industrial purposes are set forth, and it is mentioned that the Gas Company have designed and manufactured special apparatus to meet the large or small requirements of any industry, while a staff is employed specially to deal with all heat problems of the manufacturer which require a solution.

A brief history of the gas undertakings in the district is given, culminating with the incorporation of the present Company in 1864, with its present total of over 1000 miles of mains. It is stated that the Company possess their own tar distillation works, while they have available for power users large quantities of gas coke, every facility being given to users to analyze the same and compare it with their present fuel.

In a classified index to all the industries in the district, the Newcastle-upon-Tyne and Gateshead Gas Company are stated to be one of the largest gas undertakings in the Provinces, neither age nor increased size having impaired its virility or capacity for dealing promptly and sympathetically with all the problems of individual customers. Mention is made of one of this Company's recent developments —*i.e.*, the allying of itself with the local coke-oven industry for a supply of gas in bulk. Considerable export trade for the Tyne is provided by the Company by the shipment of gas coke, the quality of which, it is stated, has a high reputation abroad.

Victimization of Council House Tenants.

The following extracts are from a letter from Mr. F. J. Gould which was published in the " Bath Chronicle and Herald " on Jan. 17 :

I have been reading in the " Bath Chronicle and Herald " for some time past accounts of the proceedings at the meetings of the Bath Housing Committee, and of the City Council, in relation to the 360 Council houses at Odd Down. The discussions as to whether gas or electricity should be used for lighting, cooking, and heating produced some extraordinary statements, many of them obviously unfair both to the Bath Gas Company and to the prospective tenants. Some of the remarks in Committee were unworthy of our civic traditions, and most noticeable, perhaps, was the undisguised prejudice shown to the Bath Gas Company.

There was no question in the minds of any of the Committee who knew their subject that gas was preferable for use in these Council houses, from the points of view of both health and economy; and the recommendation for all-gas houses very properly went forward to the Council, who utterly ignored the interests of both the ratepayers of the City and the tenants who are to occupy the houses by depriving them of gas lighting.

I see it reported that " Sir Harry Hatt impressed the Council with his arguments in favour of Electricity! " It was neither in the interests of those who will occupy the houses to use it, nor to the advantage of the Municipal Electrical Undertaking of which Sir Harry is the head, because it means a monetary loss to the municipality. Now, Sir Harry cannot get away from the fact that gas lighting in Bath is cheaper than electric lighting (and I notice that the Engineer of the Gas Company re-affirmed in his letter to the Council last week that the cost of gas lighting on the Englishcombe Park Estate is only 18s. per annum including the cost of meter) and that the recommendation of the Committee to use all gas, including lighting, is a sound, commercial proposition. He would not discuss it except to say that it was impossible for the Gas Company to give an accurate estimate for lighting purposes for that Estate. Of course it was possible, but Sir Harry referred instead " to the higher principles actuating the members of the Council rather than the question of mere cost! " Those principles have already been described recently in the London Press as a " new and impudent form of dictatorship." Why should any municipality force their electrical supply upon tenants of council houses regardless of their wishes?

Notes from Scotland.

Mr. H. G. Ritchie Addresses Rotary Club.

Addressing members of Falkirk Rotary Club last week, Mr. H. G. Ritchie, Manager of the Falkirk Corporation Gas-Works, made an exhaustive introspect relating to the progress of the gas industry. Mr. Ritchie, who is President of the North British Association of Gas Managers for 1931, said that experiments in the application of coal gas to useful purposes were recorded to have taken place as far

THE NEWS—*continued.*

back as 260 years ago. At that time, it was observed in the coal district of Wigan that gas was rising along with a spring of water, and its origin was traced to the beds of coal which abounded in that district. But although it was pointed out that the same gas might be obtained from the combustion of coal, no progress was made. It was left to William Murdoch, an Ayrshire engineer, to make practical use of the discovery between 1792 and 1798. In these days there naturally were many prejudices against the new illuminant, some born from ignorance, and others from vested interests. Gradually, however, confidence was established and distrust gave way to admiration.

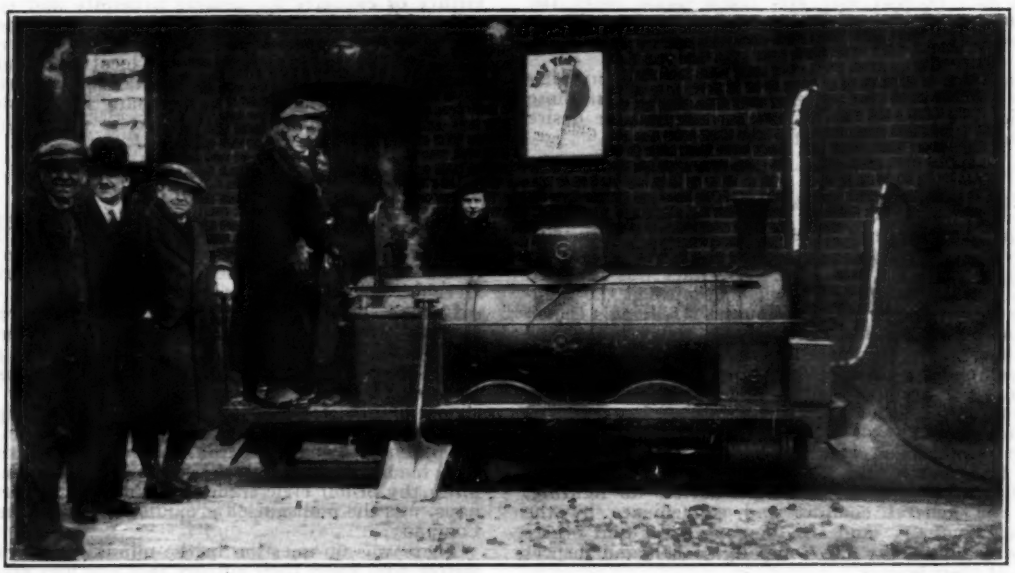
Mr. Ritchie then referred to the improvements which had taken place within recent years, and described the principles on which gas was manufactured. Taking the local gas-works for illustration, he explained by means of plans the process from the coal being discharged at the works until the housewife put a light to her stove.

The Paisley Gas Committee have decided to hold a demonstration of modes of lighting in the Town Hall.

An Exhibition of Gas Appliances will be held by the Ardrossan Town Council in the Town Hall from Feb. 17 to 20.

Following a Proposal to Erect a New Holder at an estimated cost of £6000, the Largs Town Council have agreed to appoint Mr. John Napier, of Alloa, to visit the gas-works and submit a report on the situation.

Visit of Sir Harry Lauder to Dundee Gas-Works



Reading from left to right: Mr. Harry Robb, Retort House Foreman; Mr. James Dickson, Gas Engineer and Manager; Mr. Alec Lauder, brother; Sir Harry Lauder; Mr. Alec Vallaner, brother-in-law.

The locomotive was built in 1900 by Messrs. Kerr, Stuart, & Co., Ltd., of Stoke-on-Trent. Horse power, 15; working steam pressure, 140 lbs.; fuel, coke; weight, 2½ tons; weight pulled per run, 6½ tons.

A visit to the Dundee Gas-Works was recently made by Sir Harry Lauder. He proved a very interesting and interested visitor, and was specially enamoured with the "wee pug" engine shown in the photograph and used for drawing the coke bogies from the horizontal retorts. Being an old miner, he was able to discuss with knowledge the qualities of coal, and it was specially interesting to hear him speak of the "parrot" (cannel) coal with which he was familiar in his less prosperous days.

He inquired what effect the grid system of electric supply was going to have upon the gas industry, and when informed that the Dundee Undertaking had now met keen competition in this respect for a long time, but that in looking back for only 5 years the increased sales were equivalent to the sales of a town such as Stirling, the expression from the "King of Laughter" was reminiscent of Bailie Nicol Jarvie's "ma conscience."

The visit was in all respects a happy one.

NOTES ON NEW BOOKS

GAS AND WATER ENGINEERS' CALENDAR, 1931.*

The first volume of the calendar is issued annually, the second volume at irregular intervals. In the new annual volume which is now to hand, a comprehensive lighting calendar is followed by sections devoted to the various laws and statutes applicable, either directly or indirectly, to the gas and water industries of Germany. The next section is devoted to particulars of the scientific societies and commercial federations connected with the gas and bye-products industries. Particulars are also given of the educational courses at various technical colleges.

The largest and perhaps the most useful section of the calendar gives summarized information as to the gas, water, and electricity works of Germany, Danzig, Austria, Hungary, Czechoslovakia, France, Holland, Belgium, Italy, Luxemburg, Switzerland, Denmark, Norway, Sweden, Roumania, Jugoslavia, Poland, Finland, Latvia, and Lithuania. In the case of gas-works, the information comprises the names and qualifications of one or more of the principal officials and particulars as to ownership. As regards many of the countries, the annual makes of the individual works are also included. An index to all the names, which run into several thousands, is a valuable feature. A list is also given of those operating companies owning more than one works, and serial numbers are appended, enabling all the works owned by each company to be readily located in the list of works.

Manufacturers and contractors always find that a publication of this kind is an excellent medium for bringing their specialities to the notice of potential customers and of officials likely to have an influence in directing purchases. Hence it is not surprising to find an extensive supplement devoted to the announcements of all the well-known German suppliers of equipment for gas-works and of gas appliances in general. This is accompanied by classified indexes to both products and manufacturers.

It goes without saying that the calendar, which is published under the auspices of the German Association of Gas and Water Engineers, is indispensable to all who have occasion to require information covering the production statistics or the personnel of Continental gas-works.

* Kalender für das Gas- und Wasserfach. 54th Edition, Part I., 1931. (Munich and Berlin, R. Oldenbourg. Pp. VIII. + 380 and Advertising Section pp. XXIV. + 104; price 5 M.).

Smethwick Gas Department's New Showrooms

Well-appointed Showrooms which are being opened by Sir Arthur Duckham, G.B.E., K.C.B., at Smethwick to-day mark the completion of fifty years' Gas Service in Smethwick.

Smethwick originally formed part of the district supplied by the Birmingham and Staffordshire Gas Light Company, covering an exceedingly large area. In 1875 the powers of this Company were purchased by the Corporation of Birmingham, at which time a clause was inserted in the Bill enabling the outlying districts (subject to arbitration) to erect works for themselves.

Smethwick was one of the four undertakings to avail themselves of this privilege, and in the year 1881 commenced to supply gas manufactured in their own works. During the fifty years which have elapsed, the growth of the town has been rapid, and, commensurately with it, the demand for gas, which has increased from 123 million c.ft. in 1882 to over 915 millions last year.

The Smethwick Gas Committee, at all times progressive, are fully alive to the incalculable value of improved and appropriate showroom premises, and, having completed the modernization of their works plant, set out to make their sales organization and methods of gas distribution thoroughly up-to-date. Realizing the necessity for an efficient organization of the various sections of the Distribution Department, they have erected in a central situation in the town a block of well-designed and equipped buildings for the housing of their fittings, stores, and meter and cooker repair shops, with accommodation for offices and maintenance staffs and other facilities for adequate and efficient service to their consumers.

NEW SHOWROOMS.

Provision has been made in this building for an Industrial Demonstration Room for the purpose of demonstrating, in co-operation with the Birmingham Gas Department, to their industrial consumers, who consume upwards of 40 p.ct. of the total output of gas, the latest methods of heat-treatment processes by gaseous fuel.

The new showroom, situate in a prominent position in one of the main thoroughfares, is in every way worthy of so progressive an undertaking, and thoroughly fulfils its chief function of serving to display every kind of domestic gas appliance and lighting fitting.

The inside of the showroom is spacious, well lighted and ventilated, and panelled for the greater part of its height with dark oak panelling. Many beautiful examples of lighting fittings are displayed, which are fitted with shades in parchment or silk and operated by means of switches.

The greater portion of the showroom is devoted to the display of a series of gas fires installed in specially designed fireplaces and ventilated by flue blocks built into the thickness of the walls. A large red brick fireplace, Tudor period, containing a basket fire of appropriate design is an imposing and prominent feature. All the fires have easily interchangeable surrounds.

A section of the showroom is set apart for the display of gas cooking stoves and water heaters. The display of the latter is particularly attractive and takes the form of a model kitchen and bathroom fitted with apparatus of various descriptions for heating water in quantities to suit all requirements by gas and coke. The walls in this section are finished in white tiles, and present a distinctly airy and clean appearance which should appeal to the most fastidious consumer.

The accommodation for payment of gas accounts is so arranged that the consumer traverses the extent of the showroom, and thus has the opportunity of inspecting the various types of apparatus on view.

Above the showroom well-planned living accommodation has been provided for the Sales Superintendent, and arrangements are in operation by means of which consumers may call upon the Department at any time either day or night in case of emergency.

The premises have been designed to permit at some future date the incorporation of a demonstration room for the purpose of cookery lectures, and offices for the centralization of the Administrative Staff of the Department.

The Architect responsible for the design and erection is Mr. L. Stanley Crosbie, F.R.I.B.A., of Southampton Street, Bloomsbury Square, London, the Quantity Surveyor being Mr. Reuben Holbrow, 104, Colmore Row, Birmingham.

Distribution Premises.

The distribution premises already referred to are comprehensive in all respects, and their layout testifies to the infinite care and attention to detail which have been displayed.

The fittings stores are housed in a central position in the building adjacent to the fitters' assembly room, control office, and meter and cooker repair shops, and are provided with covered loading deck accommodation for the receipt and despatch of goods. Ample accommodation has been provided for the issue of stores to fitters and maintenance attendants, and the office of the District Inspectors is divided from the men's assembly room by means of a glass partition, thus enabling the inspectors to exercise adequate supervision. Separate accommodation has been provided for the women maintenance attendants who will be engaged at a later date in cleaning and maintaining consumers' burners on the district.

Steel storage bins have been installed specially designed

DEMONSTRATION SHOWROOM ON GROUND FLOOR. METER AND COOKER REPAIR SHOPS ON FIRST FLOOR.

for the various classes of materials, and in many cases these have been provided with platforms to enable the storekeeper to have ready access to same.

The meter and cooker repair shops, housed in a two-span roof and divided by a light steel partition, are fully equipped with overhead transporters and machinery for execution of repairs and renewals at the lowest possible cost, and are so arranged that the processes of dissembling, cleaning, re-assembling, and spray painting are carried out in their proper sequence, reducing transport about the shops to a minimum. The "steel chest" method of cleaning cookers has been adopted, and the necessary steam is raised by a Bonecourt gas-fired boiler installed in the Industrial Demonstration Room, which at the same time serves as a demonstration set. Painting of renovated fires, cookers, and meters is done by means of spraying, in view of the speed and improved finish imparted to the apparatus, the gas fires and cookers being stoved in a specially designed oven to give a hard and lasting surface. A cellulose spraying plant has also been provided for the art finish of fires and surrounds.

There is a fully equipped meter testing station, in which are installed all the necessary accessories for ensuring accuracy of registration, &c. Special arrangements have been made for testing automatic attachments on slot meters.

Ample garage accommodation has been provided for the Department's motor transport, while advantage has been taken of the natural fall in the ground enabling basements to be used for the storage of handcarts, mainlayers' tools, and materials for use in cases of emergency.

The Architect for the Distribution Premises was Mr. George Randle, of Smethwick, and the Quantity Surveyor Mr. Reuben Holbrow, of Birmingham.

Facts and Figures for 1930.

The following figures relating to the work of the Smethwick Gas Department in 1930 will be of interest:

Number of population served	86,870
Area of supply	2,500 acres
Gas made	4,117,526 therms, or 915,005,800 c.ft.
Maximum quantity of gas sent out in one day	15,421 therms, or 3,427,000 c.ft.
Maximum quantity of gas sent out in one hour	1,440 therms, or 320,000 c.ft.
Coal carbonized	49,365 tons
Gas made per ton of coal	83·41 therms, or 18,536 c.ft.
Gas sold per ton of coal	80·98 therms, or 17,994 c.ft.
Tar made	758,372 galls.
Length of mains	80¼ miles
Employment roll (excluding staff)	204
Annual wages account	£38,000
Number of consumers	18,527
Number of gas appliances in use—	
Cookers	14,102
Fires	6,562
Wash-boilers	2,340
Grillers	2,945
Geysers, water heaters, gas irons, &c.	1,345
Shop lamps	883

COOKER REPAIR SHOP AT SMETHWICK.

SECTION OF STORES AT SMETHWICK, SHOWING STEEL BINS FOR FITTINGS, COMPO TABLE, AND SHELVING.

Gas and Electricity for Cooking

New Comparative Tests

By J. H. Steinkamp

In the July issue of the German paper "Elektrizitätswirtschaft," Scheuer communicates the results of a series of comparative tests with gas and electricity, which he carried out in co-operation with his wife during a period of ten weeks.

These tests have relation to the use of gas and electricity for cooking, roasting, baking, and washing plates and dishes, excluding all the other applications—*e.g.*, linen washing, bathing, floor-cleaning, &c. The test household consisted during the whole period of testing of three adults, while the household curriculum, indicated as being one of the modest middle-class, was always constant.

A gas range with four burners and baking oven was used. Pans and other vessels for cooking were of aluminium. A gas water heater served for the production of hot water. On the other hand, an electric furnace with three cooking plates and baking oven with a connecting value of 5·5 KW. was used, while an electrical water heater produced hot water in the electric household.

Alternately one week gas and the other electricity was employed, and the appliances were used by the kitchen maid in the normal manner, without any special precautions.

Table 1 shows the results of this series of tests.

Table 1.

Week.	Electrical or Gas Range.			Electrical or Gas Water Heater.			Total.		
	Cub. M.	Kw.-h.	1 Cub. M. = Kw.-h.	Cub M.	Kw.-h.	1 Cub. M. = Kw.-h.	Cub. M.	Kw.-h.	1 Cub. M. = Kw.-h.
1 and 2 . .	..	..	..	..	..	..	16·9	61·6	3·7
3 ,, 4 . .	11·3	28·6	2·5	5·9	33·1	5·9	17·2	61·7	3·6
5 ,, 6 . .	11·9	26·1	2·2	6·1	33·1	5·4	18·0	59·2	3·3
7 ,, 8 . .	8·8	26·3	3·0	5·2	30·7	5·9	14·0	57·0	4·1
9 ,, 10 . .	11·7	24·5	2·1	5·1	28·5	5·6	16·8	53·0	3·2

Dipl.-Ing. H. A. Blum published in "Das Gas- und Wasserfach," 73, 853 (1930), some remarks in relation to Scheuer's tests, from which the following has been extracted.

The method which Scheuer used to calculate the comparative figures is not without risk. It requires perfectly constant housekeeping, which in a normal household is difficult. As a proof of this, consider the variations in the separate week results. Table 1 shows in the seventh and eighth weeks a remarkably low use of the gas range, while in the ninth and tenth weeks the use of current is remarkably smaller than in any of the foregoing weeks. Remarkable, too, is the reduction, in both gas and electricity, for water heating, which in both cases is about 15 p.ct.

The figures are not sufficiently numerous for drawing a definite conclusion. However, it is fair to consider the average as approximately true. First of all, the figures of total consumption are striking. The values found by Scheuer indicate a monthly consumption of 71 cub.m. (2535 c.ft.) of gas or 250 KW.-H. of current for a family of only three persons. Tests carried out by Blum ("Das Gas- und Wasserfach," 72, 247, 1929) showed a consumption of 70·5 cub.m. of gas compared with 213·2 KW.-H. of electric current; these figures, moreover, have relation to a more extensive use of both fuels—that is to say, including the preparation of bathing water. Thus it seems that the household dealt with by Scheuer was less simple than that of the "modest middle-class." However, it is interesting that Scheuer finds a consumption of current for cooking of 1·17 KW.-H. per head per day.

Though these results are not to be considered as a measure for the average gas consumer, they are characteristic as to their comparative nature. The total use of gas and electricity varies between 1 : 3·2 and 1 : 4·1, with an average of 1 : 3·6. This result, which is to be considered as a statement from the electrical side, agrees very well with similar statements of the gas industry. The average found by Scheuer is 1 : 3·5. For complete housekeeping, including bathing installation and general hot water provision, a comparison even more favourable to gas is to be expected, because hot water provision is far cheaper with gas than with electricity.

IN CONTINENTAL COUNTRIES - - -

Abstract Translations from the Technical Press of France and Germany.

PETROGRAPHIC PRINCIPLES APPLIED TO COAL PREPARATION.

K. Lehmann and E. Hoffmann in "Glückauf," 1931, 67, 1-14 (Jan. 3), discuss the differences in the coke making properties of vitrain, clarain, durain, and fusain, and describe methods by means of which these constituents of coals may be concentrated and subsequently employed under controlled conditions for the purposes for which each is most suited. Such a separation promises technically important results for particular types of coal.

An appropriate system of disintegration, screening, and air separation enables the desired separation to be effected, since the durain is more resistant to grinding than are the other constituents of the coal. In the disintegration process, "elastic percussion" is said to be necessary, and it is necessary, also, to secure that the vitrain and clarain fractions do not become ground down excessively finely. In collaboration with Herr Schmidt, a special type of percussion mill was designed. The mill, in its original form, contained a horizontal shaft rotating in a rotating drum having the shape of the frustum of a cone. The shaft carried a series of swinging percussion rods with oar-shaped ends. The disintegration has for its object not the grinding-down of the coal to a definite fineness, but, on the contrary, the physical separation of the individual constituents. The brittle clarain and vitrain thus tend to be broken down finely, while the durain remains coarse. The fusain becomes very fine and is, indeed, resolved into the finest débris of its cell structure. The drum of the mill was of perforated metal and enabled the mixed vitrain, clarain, and fusain to pass through, the durain being discharged at the end of the mill as oversize material. It was necessary to adjust the speed of rotation of the shaft and of the drum, and the size of the perforations in the drum, to suit the particular coal being handled. Typical results obtained with this mill from nut coal were as follows when the drum rotated at 7 r.p.m. and the shaft at 130 r.p.m., the holes in the drum having a diameter of 1/10 in.:

—	Vitrain + Clarain.	Durain.	Fusain.	Shale.	Pyrites.
	P Ct.	P.Ct.	P.Ct.	P.Ct.	P.Ct.
Fine product . .	65·6	28·0	4·0	2·2	0·2
Coarse product .	45·0	49·7	1·9	2·2	1·2

With variation in the size of feed material, it was found that the coarser the feed the better the separation. A fine feed requires a high speed of rotation of the percussion rods. The degree of concentration effected could have been improved had the perforations on the drum gradually diminished in size towards the discharge end, instead of being of uniform size.

A new design of mill is of the vertical type, and concentration of the constituents of the coal occurs in stages in a drum having a double wall. The inner wall is serrated, the upper sides of the serrations being perforated, thereby enabling the vitrain and clarain concentrate to pass through and enter the space between the walls. The percussion rods are mounted horizontally on a vertical shaft, the positions of the rods corresponding with the serrations. Only the shaft and rods rotate. Fusain dust is withdrawn from the top of the space between the walls by means of an exhaust fan, and some is withdrawn also, by similar means, from the durain fraction leaving the mill. The drum tapers outwards from top to bottom and the percussion rods increase in length proportionately. Hence, at the lower end, the linear speed of rotation is greater and the descending coal therefore becomes progressively finer. The screening action of the perforated portion of the serrations is assisted by a suitable tapping device. To compensate for the progressive reduction in the concentration of vitrain, clarain, and fusain in the successive stages of the mill, the perforations are gradually reduced in size—*e.g.*, from 0·16 to 0·08 in. Where this is necessary, baffles may be inserted in the drum to direct the course of the coal. The undersides of the serrations act as shock surfaces.

The fine dust recovered (particle size below $\frac{1}{200}$ in.) contains nearly all the fusain present in the coal, and, in some cases, has a content of fusain as high as 35 p.ct.

In connection with the petrographic separation of coal it is advisable to eliminate the dirt by a process of dry cleaning, since the percussion mill will not work with wet coal, and a wet washing process is therefore not possible if cleaning is to be effected before percussion. Preliminary removal of the dust is advisable.

Tests made with a Bamag-Meguin dry table on coal from the Brassert mine showed the following results:

Size of feed	½ In.-⅛ In.		⅛ In.-⅛ In.		⅛ In.-$\frac{1}{50}$ In.	
Throughput, tons per hour	5·3		8·5		7·2	
	Yield.	Ash.	Yield.	Ash.	Yield.	Ash.
Products—						
Clean coal . . .	75·4	4·65	79·6	7·45	58·28	8·93
Middlings . . .	14·7	47·27	11·7	56·32	20·78	20·21
Dirt	9·9	80·91	8·7	77·34	20·94	67·32
	100·0	18·47	100·0	19·25	100·0	23·52

On the table available, it was not possible to treat successfully coal of size $\frac{1}{13}$ in.-0 in. or ⅛ in.-0 in. Nevertheless, in the case of a fine feed it might be possible to make use of an artificial bed consisting of middlings of a coarser size, in which case the fine dirt and coarse middlings would possibly come out together and could be separated by screening.

The firm Schüchtermann & Kremer-Baum have treated ¼ in.-0 in. coal from the above mine and have succeeded in cleaning the ⅛ in.-0 in. screened fraction of the coal, as will be evident from the following results:

Size of feed	½ In.-¼ In.		¼ In.-$\frac{1}{50}$ In.		$\frac{1}{13}$ In.-0 In. (De-dusted.)	
Throughput, tons per hour	7·5		5·6		5·0	
	Yield.	Ash.	Yield.	Ash.	Yield.	Ash.
Products—						
Clean coal . . .	68·5	5·52	36·9	7·2	47·2	7·0
Middlings . . .	23·2	28·0	63·1	34·8	41·8	31·3
Dirt	8·3	78·0			11·0	72·2
	100·0	16·75	100·0	24·8	100·0	24·37

The middlings can be treated very successfully in a wet washer with the result that the combined dry-wet process scarcely differs in efficiency from a wet process. There can be no objection to a wet process for the ½ in.-0 in. or the $\frac{1}{13}$ in.-0 in. fraction, since these fractions are already very much enriched in vitrain and clarain, and hence do not require to be separated petrographically.

The above results show that dry cleaning can very successfully be employed in connection with resolution of coal into its constituents. If further improvements are not effected in dry cleaning technique as regards the finest sizes (apart from dust) a wet process or a flotation process may always be employed.

Flow diagrams are given showing the treatment of coal in crushers, screens, dry tables, and percussion mills for recovery of durain and vitrain *plus* clarain concentrates, fusain concentrates being obtained by air aspiration. The fine dust rich in fusain is particularly suited for use as pulverized fuel, the vitrain *plus* clarain concentrate for coke manufacture, and the durain concentrate for hydrogenation, gasification, or low-temperature carbonization.

Such a scheme can only be carried out and be made economically sound by close petrographic control. The value of gas coals and high volatile coals is increased by the separation. For the more highly transformed coals, the process is still of importance though to a less extent, since the degree of coalification is so great that the coking properties of the vitrain and clarain are sufficiently high to render the presence of durain innocuous, and, indeed, the presence of inerts is desirable. For such coals, the chief desideratum is to eliminate the fusain, often present in a fairly high proportion; and, in general, air separation of the fines suffices. It is only when the coal is very rich in fusain or when it has to be mixed with a younger coal sensitive to the presence of fusain that the percussion process must be employed to liberate the remainder of the fusain.

The complete process will, of course, be applied only to coals from seams rich in durain. On the assumption that, on an average, the coal would contain, on the ash free basis, approximately 65 p.ct. vitrain *plus* clarain, 30 p.ct.

durain, and 4 p.ct. fusain, the products would be as follows:

—	Yield.	Vitrain + Clarain.	Durain.	Fusain.
	P.Ct.	P.Ct.	P.Ct.	P.Ct.
Vitrain *plus* clarain concentrate	50–60	80	20	1·0
Durain concentrate	25–35	35–40	60–65	1·0
Fusain concentrate (dust) . .	7	60	10	30

As regards operating costs, no details can be given, but it would seem that the costs would not appreciably exceed those of a wet washing process.

The market value of the products cannot be estimated until the consumer has been convinced of their value and suitability. The vitrain-clarain concentrate is obtained with a low content of durain and fusain, and, above all, dry. Since it has a high caking index and is rich in volatile matter, it should command a price higher than that of washed fines. Many coking plants should welcome the product, since thereby the crushing of lump coal or nuts is avoided. Since the yield of gas and bye-products is considerably enhanced, there should be a ready market. There is no need to stress the difficulties of drying fine coals and slurries resulting from wet processes; and the economic advantages, in coke-oven practice, attending the carbonization of a coal not too high in moisture are well known.

Since durain, and especially that from the younger seams, gives very good results in hydrogenation, a ready market should be assured for it. The fact that the fusain concentrate is obtained in form ready for use as pulverized fuel obviates the need for grinding and drying plant in pulverized fuel installations; hence this product, too, should be readily marketable.

Tables are given showing the separation effected with coals from various seams and the properties of cokes obtained in box-tests from blends of the products obtained from pairs of seams. It is shown that in some cases a coal will not yield a good coke even though much of the durain has been removed, whereas in other cases the vitrain-clarain concentrates yield a vastly improved coke of good quality.

When coals which give permanent expansion on carbonization have to be treated, blending with a durain concentrate enables less of the diluent to be used than would be the case if a crude coal were used as a diluent. Good results have recently repeatedly been obtained by addition of pulverized nut coals to expanding coals. This has been due to the fact that nuts tend to be rich in durain. More recent work has shown that coals useless for coke manufacture owing to their expansive properties can be economically rendered suitable for use by addition of durain derived from a young coal.

Tables are given, also, showing the results of low-temperature carbonization of durain fractions, good lump coke being obtained in a C.T.G. plant.

The investigations show that two important factors are involved in the coking properties of high volatile coals, their petrographic composition and their degree of coalification, and either may be responsible for militating against the production of a good coke. The first factor may be annulled by an appropriate petrographic separation, but the second factor needs further consideration.

One fact that needs explanation is that vitrain and clarain behave better than does durain in high-temperature carbonization, whereas, in some cases, a durain yielded better results under conditions of low-temperature carbonization in a C.T.G. plant than did the vitrain-clarain concentrate at a high temperature. A young coal in coke ovens evolves part of its bitumen before the coal has reached its softening-point, so that neither aggregation nor swelling of the coal occurs, and a well fused coke is not obtained. This holds good for the durain as well as for the vitrain and clarain. In order that a coke may be obtained, the too speedy decomposition of the bitumen must be hindered or the degree of coalification must be increased. One possibility is to apply pressure to prevent evolution of gas, especially in the early stages. Another is to apply heat so quickly, and to have so rapid a heat penetration, that by the time the softening temperature has been reached as little as possible of the bitumen has been decomposed. Fischer and his collaborators have studied the first possibility, and, by carbonization under pressure, have succeeded in making a good coke from Brassert coal which otherwise is not cokeable. Possibly, then, the explanation of the anomalous behaviour referred to above lies in the rapidity with which carbonization occurs in the C.T.G. plant owing to the walls being of metal and the thickness of the coal under treatment being small. A further superiority of the low-temperature durain coke compared with the high-temperature coke was the absence of contraction fissures.

Petrographic separation also effects a reduction in the sulphur content, since part of the pyrites is liberated when the coal constituents are physically separated and becomes concentrated in the fusian fraction, in which its presence is not a drawback.

The Institute of Fuel

Presentation of the Melchett Medal and Melchett Lecture

At a meeting arranged by the Institute of Fuel on Friday, Jan. 23 (in the Lecture Hall of the Institution of Civil Engineers, Great George Street, Westminster), the first Melchett Medal was presented on behalf of the Institute, by the President, Sir David Milne-Watson, LL.D., D.L., to Dr. Kurt Rümmel, of the Warmestelle (Institute of Heat Economy), Dusseldorf. Dr. Rümmel also delivered the first Melchett Lecture, the subject of which was "The Calculation of the Thermal Characteristics of Regenerators."

The Melchett Medal, as its name indicates, was founded by the late Lord Melchett (who was the Founder-President of the Institute of Fuel), to be awarded annually to such person, whether a member of the Institute or otherwise, as in the opinion of the Council has done either original research or professional, administrative, or constructive work of an outstanding character, involving the scientific preparation or use of fuel, provided the results of such work have been made available within recent date for the benefit of the community. Another condition is that the award is made without restriction as to the nationality of the recipient. The late Lord Melchett gave to the Institute, some months ago, a sum of money sufficient to found the Medal in perpetuity.

A Tribute to Lord Melchett.

The President, before making the presentation, paid a tribute to the late Lord Melchett, and recalled particularly his work for the Institute. The President referred to Lord Melchett's enthusiasm, and acknowledged that it was due to his zeal that the Institute had come into existence.

(The gathering stood in silence for a short period as a mark of respect to the late Lord Melchett, and as a mark of sympathy to his family in their bereavement.)

The terms of the award, continued the President, illustrated very clearly the character of the late Lord Melchett, who looked upon all industrial questions from a very wide point of view. The Council of the Institute, having in view his wishes with regard to the award of the Medal, had come to the conclusion that there was no one more worthy to receive the first Medal than Dr. Rümmel—a distinguished scientist who had spent his life working for the benefit of industry. His name was primarily associated with the world-famous Dusseldorf Warmestelle, which was formed in 1919, at a period when the iron and steel industry in Germany was labouring under great difficulties, and when it was necessary to practise economy in every direction. Dr. Rümmel founded that institution for the express purpose of reducing costs of fuel, but to-day it employed no less than a thousand fuel technologists. He had applied himself to the solving of the fundamentals of combustion and the application of heat, the production and distribution of power, and the training and organization of personnel, and also the scientific co-ordination of industrial departments and even whole industries. He had done much to pave the way for the great advance of the German iron and steel industry, and, through the instrumentality of the Warmestelle, the average cost of fuel in the iron and steel industry in Germany had been reduced overall by 15 p.ct. Dr. Rümmel, however, had never kept his scientific knowledge to himself. He had contributed many papers for the benefit of industry on iron and steel works practice, coking, and power generation and transmission.

Following the presentation of the Medal, Dr. Rümmel delivered the Melchett Lecture. It concerned an investigation carried out by the Warmestelle, Dusseldorf, of the process of heat transfer in regenerators, in order to evolve a simplified method of calculation, but of sufficient accuracy to meet practical requirements and to determine at the same time the numerous coefficients appearing in the

formulated equations. Dr. Rümmel also referred to the results of experiments carried out in an experimental regenerator, and showed that the calculated results were in accord with the actual results.

On the motion of Dr. C. H. LANDER (Director, H.M. Fuel Research Station), seconded by Mr. S. MCEWEN, a hearty vote of thanks was accorded Dr. Rümmel for his lecture.

COMPLIMENTARY DINNER TO DR. RUMMEL.

Following the presentation ceremony, an informal dinner was held at the Connaught Rooms, Great Queen Street, W.C. 2, to honour Dr. Rümmel, who was accompanied by Mrs. Rümmel. The President of the Institute (Sir David Milne-Watson) again presided.

The toast of "The Institute of Fuel" was proposed by Herr E. RUETER (First Secretary, German Embassy), representing the German Ambassador, Baron von Neurath, who was unable to attend owing to indisposition. On behalf of the Ambassador, Herr Rueter acknowledged pride and satisfaction in the fact that the Institute had presented its first Melchett Medal to a German—an action which was appreciated as one more of the many signs of the fair and disinterested way in which British science recognized and rewarded merit and success, without regard to nationality. He coupled with the toast the name of the President.

The PRESIDENT, responding, said that although the Institute had been in existence for only two or three years, it had already accomplished a great deal, not only at home, but also abroad. He paid a tribute to the thoroughness and clearness of the German mind in applying itself to industrial problems, of which Dr. Rümmel's lecture was an excellent example.

Sir WILLIAM J. LARKE, K.B.E. (a Vice-President of the Institute, and the Director of the National Federation of Iron and Steel Manufacturers), proposed the toast of Dr. Rümmel. He recalled that the original purpose of the Warmestelle had been to study economy in the use of fuel, but as it had developed it had studied the application of science to all industrial processes, and Dr. Rümmel and his organization had been generous enough to make known to the world at large the results of their studies. One great difficulty in the application of science to industry in the past, he suggested, was that the scientists and the industrialists did not speak a language understood by both, but it was men such as Dr. Rümmel who were the interpreters of scientific discoveries, and whose interpretations enabled those discoveries to be applied to the benefit of mankind. Industry had found the problems in practice, but too seldom in the past had it referred those problems to the scientists. It was pleasing, however, that there was now closer co-operation.

Mr. H. A. HUMPHREY (Chairman of the Melchett Medal Selection Committee) seconded the toast, and Sir PHILIP DAWSON, M.A., M.P., speaking in German, heartily supported it.

Dr. RUMMEL, in his response, said that he and his staff were always very glad to co-operate and collaborate with their English colleagues, who had done so much to assist in bringing together the scientist and the technician. Though references were made often to the alleged difference between theory and practice and between economy and science, he did not believe there was any difference. In this connection he urged that scientific men would think more in terms of costs.

NEW PLANT AT - - BATLEY - -

Inauguration of Gasholder and Condensers, erected by Firth Blakeley, Sons, & Co., Ltd.

THE COMPANY PRESENT AT THE CEREMONY.

A notable event in the history of the Batley Corporation Gas Undertaking took place on Jan. 13. when a new gasholder and condensers, which have been installed at the works to replace plant that had been in use for more than fifty and sixty years respectively, were formally inaugurated by Alderman John Deasy, J.P., Chairman of the Gas Committee. The new plant is the latest of its kind and has been erected at a cost of about £6500 by Messrs. Firth Blakeley, Sons, and Co., Ltd., of Vulcan Ironworks, Church Fenton.

The new spiral-guided gasholder, which is the first of its type seen at Batley, is of a capacity of 300,000 c.ft., and is in two lifts each 25 ft. deep. The guiding of the holder is by means of Blakeley's patent "Vulcan" ball-thrust carriages, a new arrangement which has appealed strongly to gas engineers since they were introduced about 18 months ago.

The new condensing installation is in two units, one half being on the atmospheric cooling principle, and the other half water-cooled, both systems being of Blakeley's patent rectangular type, which gives a high standard of efficiency. Each unit is of a capacity of 500,000 c.ft. The method of temperature control in this type of condenser is a particularly strong feature, enabling the temperatures to be regulated to a nicety irrespective of climatic conditions.

The ceremony itself was of a simple character, Alderman Deasy turning a valve that feeds the mains from the new holder. Before actually performing the operation, Alderman Deasy said he appreciated very highly the honour of being invited to inaugurate the new plant. The Gas Com-

mittee had been delighted with the very efficient and thorough manner in which the work had been carried out by the contractors.

As a memento of the occasion, Mr. William Blakeley, the Managing Director of the contracting firm, presented a timepiece each to Alderman Deasy and Councillor Robert Sykes (Vice-Chairman of the Gas Committee). The visitors then made a tour of inspection of the works, under the guidance of the Engineer and Manager (Mr. S. B. Dean), after which the party were conveyed to the Batley Town Hall, where they were the guests of the contractors at luncheon.

Luncheon Speeches.

"The Batley Gas Committee and Undertaking" was proposed by Mr. W. B. McLusky, of Halifax, who examined salient features of the Batley Gas Undertaking and made suggestions as to future policy. While the Department were making gas very cheaply—2s. 5d. per 1000 c.ft.—they had to pay the equivalent of 2s. 11d. per 1000 c.ft. for interest and sinking funds, rents, rates, and taxes. The management of the undertaking was very good, and if they had an ordinary capital burden they could be selling gas at about 3s. per thousand. If Batley were able to sell four-and-a-half times more gas, their interest and sinking fund charges would be 8d. per 1000 c.ft. He believed, however, that the Batley undertaking would do better in the future. The Department had 11,000 customers, so that, although their debt per 1000 c.ft. of gas sold was very high, the debt per customer was not high, being equivalent to about £2 5s. per customer per year. So that if every customer in Batley had to pay a charge of £2 5s. a year, which was 11s. 3d. a quarter, or 10½d. a week, they could sell gas at 2s. 6d. per thousand. All they had to do, therefore, was to collect an average of £2 5s. per customer per year and sell their gas at 2s. 6d. It was not a fairy tale. Such a system had been in operation at Halifax for ten years. Suppose they said to the occupants of cottage houses, "Your share of the big debt on the gas undertaking is 6d. per week; if you will pay that 6d. per week fixed charge your gas will cost you 2s. 6d. per 1000 c.ft." In the case of larger houses and factories, the fixed charge would be proportionately higher. At Halifax, some large manufacturers paid £400 a year, and paid it cheerfully. He ventured to think that under such a system every householder in Batley would become an increased consumer for cooking and heating. He would probably burn 1000 c.ft. of gas per week. That would cost, in the case of a cottage house, the 6d. fixed charge and 2s. 6d. for the gas, a total of 3s. per week; and the householders would save more than that in labour and raw coal. The average consumption of gas in Bath was 56,000 c.ft. per customer—the highest in the country. Batley's average was 13,000 c.ft. per customer—which, the speaker showed, by quoting the figures for many other towns, was comparatively small. If Batley's customers averaged 56,000 c.ft., the Department's fixed charges per 1000 c.ft. would be negligible, and if the figure was only half that amount, their gas would be very cheap.

"Asking for Trouble."

Alderman John Deasy, replying to the toast, thanked Mr. McLusky for his admirable speech, and jocularly remarked that the fact of a Scottish Engineer advising an Irish Chairman how to conduct a business in England was an illustration of the cosmopolitan character of their industry. [Laughter.] Despite differences of opinion with regard to the respective merits of competitive productions for lighting, heating, and power, those interested in the gas industry still maintained that gas would be able to retain its place against any competition. ["Hear, hear."] The Batley Gas Committee had got down to their work with the firm intention of putting the undertaking in a sound position, though they inherited a heavy burden. Their predecessors, who originally borrowed money for gas plant on a 60 years' basis, were obviously "asking for trouble," and the majority of that plant, for which the Department were still paying about £6000 a year interest and sinking fund, had been demolished many years ago. That was why consumers were having to pay an increased price for gas. But after 1933, when those payments on the old loan would be completed, the Gas Committee were hoping to put into operation schemes that would benefit gas consumers and the ratepayers generally. He thought the Corporation had every reason to be proud of its present gas plant, which was thoroughly up to date. Pointing out that the success of any undertaking depended largely on those in control, Alderman Deasy paid very high tributes to the Engineer (Mr. S. B. Dean), his Assistant (Mr. Brook), and the staff, and incidentally to their former Engineer (Mr. R. H. Duxbury), whom they were glad to welcome at that function.

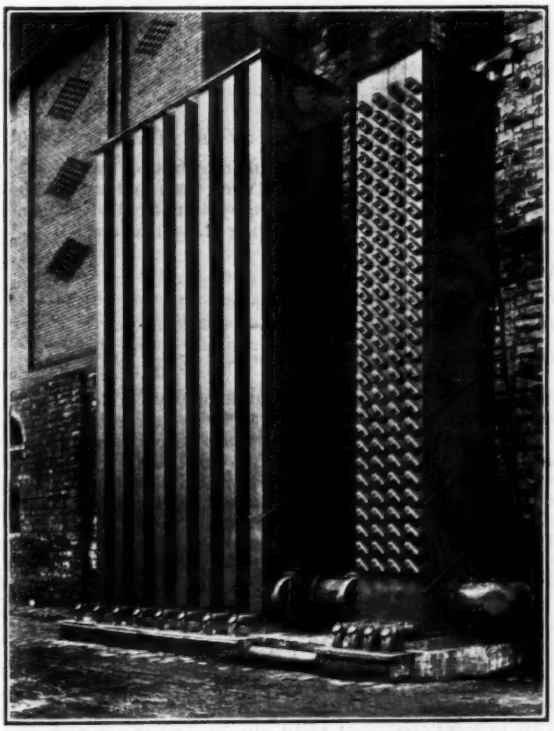
In the absence of Mr. E. H. Hudson, of Normanton, the toast, "The Town and Trade of Batley," was proposed, at short notice, by his son, Mr. Norman Hudson, the Engineer of the Mirfield Gas Company. Referring to the depressed state of trade in the district, Mr. Hudson said the clouds were certainly rather dark and heavy, but he was sure the spirit of Batley people—the Yorkshire spirit—was not being disheartened, but that, on the contrary, they were striving to prepare for the day of the silver lining that must appear some time. When, after 1933, the Batley gas undertaking was free from a debt, for which he gathered the present Committee were not to blame, a time of benefit to the town and trade of Batley would surely arrive. He meant the era of cheap gas, because he was sure that cheap gas in any town was of great assistance to trade in any competitive field, whether for home or foreign markets.

A Good Town with Bad Trade.

The Mayor of Batley (Alderman Edwin Bruce), acknowledging the toast, said he would have much preferred it to have been reversed to read "the trade and town." The town was good, but the trade being so bad—in fact, almost stagnant—it could, unfortunately, be speedily dealt with. He suggested that those responsible for the control of businesses should follow the example of the Batley Corporation in utilizing the present period of "marking time" for re-organization and improvements, as in the Gas and Waterworks Undertakings. With those two undertakings now completely modernized and of sufficient capacity to deal with any demand that might be reasonably expected, the Corporation were not only ready for but anxiously awaiting the trade revival.

"In Capable Hands."

Councillor R. Sykes (Vice-Chairman of the Gas Committee) proposed "The Visitors and Contractors." Visitors to Batley to-day, he feared, must see a difference compared with a few years ago. He did not know how many mills had been closed down in recent years, but there seemed to be an opinion that in the next two or three years things would be better. Speaking as an Engineer, Mr. Sykes paid a high compliment to the work of the contractors. Better work, or a more careful foreman and supervisor, he had never seen in his life. [Applause.]



The Condensing Plant (Firth Blakeley's New Rectangular Type).

Mr. R. H. Duxbury, of South Bank, and formerly of Batley, responding for the visitors, recalled his ten years' association with Batley and the opening of the vertical retorts during that period. The visitors had been much interested in the new holder and condensers, and hoped they would be a cog in a wheel that would soon revolve fast enough to bring renewed prosperity to the undertaking, which the management deserved. Gas was not dead, nor were its days numbered, but, unfortunately, the general trade depression was having some effect on all industries, including gas. It was up to them all, therefore, to exert every effort to counteract the depression, and it was evident that in Batley they were doing so. He wished them every success.

Mr. William Blakeley, Managing Director of the contracting firm, also responded. He gratefully acknowledged the various complimentary references to the work of his firm, and said he was very gratified to receive the order for the new plant because of his close association with the district for a long number of years. Acknowledging the harmonious co-operation that had existed between his firm as contractors, and the Chairman, Vice-Chairman, and Officials of the Gas Committee during the erection of the new plant, Mr. Blakeley remarked that in Mr. Dean, ably assisted by Mr. Brook, the Committee and Undertaking were in very capable hands. Incidentally, there would not be a penny for "extras" in connection with the contract, which reflected the completeness of the specifications issued by the Committee's Engineer.

THE "JOURNAL" TECHNICAL RECORD

Which also contains Full Reports of Meetings of Gas and Allied Associations

Nature and Properties of Certain Hydrocarbons in Coal Gas, and Their Effect on Meter Leathers.

By R. S. ANDREWS, B.Sc., Chief Chemist, Metropolitan Gas Company, Melbourne.

[From a paper before the Australian Gas Institute.]

(*Concluded from p.* 159.)

THE EFFECT OF THE LIGHT OIL ON THE METER LEATHERS.

In order to acquire some useful information on the effect of this light oil on the meter leathers, 1000 meters that had been some years in service were systematically examined and segregated under the following classifications:

(*a*) Good leathers.

(*b*) Rotted leathers.

(*c*) Dried leathers.

(*d*) Leathers with resin deposits.

The varying factors, and multiplicity of conditions, entering into the life history of a meter present a problem of baffling complexity. The majority of good leathers could be accounted for by the fact that their time of service had not been great, and that the majority of them had occupied a high position indoors, where deposition of moisture and light oil were at a minimum.

The conception of the phenomena taking place within the meter that we gleaned from the investigation was that, after a meter had been operating for a brief period, the oil in the leather diaphragm dressing scrubbed the light oil from the gas. The leather, being already saturated with dressing oil, could not hold the additional quantity caused by the light oil dilution, and so the oil commenced to drip from the leather, its rate of extrusion being accentuated by the reduction in viscosity owing to the light oil dilution.

This process continues until all the dressing is removed. If the leather is removed from the meter at this period, it will be found to be quite dry. After the dressing has been removed, the leather is left unprotected, to be preyed upon by the ravages of the moisture content of the gas, and its life from now onward is not protracted, for the leather readily rots in the constant presence of moisture. Thus marked advantages may be hoped for with dehydrated gas. During the enactment of this life history, the polymerization of the unsaturated hydrocarbons is proceeding unmolested, but, as long as the light oil is there in sufficient quantities, the resins will remain in solution; but it frequently occurs that, with increased temperatures, the light oil deposited in the bottom of the meter re-inhabits the gas, leaving behind a resinous deposit. This deposit is not merely on the surface of the leather, but impregnates the very fabric itself. If a small quantity of light oil is present, the resin is extremely gummy and adhesive, frequently causing the leather to adhere to the bottom of the meter, which tears on the expansion of the diaphragm. If, however, deposited light oil is absent and conditions are not conducive to its deposition, the resin deposit becomes brittle in nature, causing the leather to crack, and allowing the gas to pass unregistered.

To verify these conceptions, meters were constructed with glass fronts and backs, and the process was witnessed in its entirety.

The additional deposition of oil at the termination of a hot day was most marked.

After one experimental meter had passed 50,000 c.ft., the following observations were made:

Light oil deposited	300	c.c.
Leather dressing removed	66	,,
Resin formed	12·8	grammes

The 1000 meter leathers examined fall into their respective classification as follows:

	P.Ct.
Good leathers	41·4
Rotted leathers	29·0
Dried leathers	12·4
Leathers with resin deposits	12·4

Forty p.ct. of the leathers with resin deposits were completely broken through the deposited resin. The majority of the good leathers were from meters recently placed in service, and from meters in high positions where condensate in the mains would be unlikely to drain. Most of the dried leathers were also found in high positions indoors, while the rotted and resined leathers were found in low positions forming a trap for all condensate likely to be deposited in the services, or in positions where temperature changes would be at the maximum.

These 1000 meters had been chosen at random just as they came into the shop. Some of them had fulfilled their time of service, others were faulty, and were brought in to be repaired. Those meters that required new leathers before their term of years had expired were placed on one side and their localities noted. Sixty-four p.ct. of them were from areas being supplied with gas from continuous vertical retorts, and the remaining 36 p.ct. from districts being supplied with a gas containing 50 p.ct. from continuous vertical retorts.

SURVEY OF THE COMPANY'S RECORDS.

A comprehensive survey of the Company's records for five years from 1923 to 1927 inclusive yielded some intensely interesting revelations, which have been correlated in the following table:

Data Showing Apparent Influence of Continuous Vertical Gas and Efficiency of Washing Plant on Meter Repairs.

Year.	P.Ct. of Continuous Vertical Gas.	Faulty Meters.	NH₃ in Gas, Grs. per 100 C.Ft.	Unaccounted-for Gas. P.Ct.	Gas Distributed in C.Ft.	Meters in Service.	Meters Changed per 10,000,000 C.Ft. of Gas.
1923	33·98	3283	..	10·58	4,265,851,000	166,513	7·7
1924	36·18	4966	..	11·07	4,385,785,000	168,928	11·3
1925	51·53	6752	5·43	12·00	4,467,238,000	170,857	15·1
1926	60·62	7120	4·40	13·45	4,710,892,000	177,529	15·1
1927	50·80	4641	0·84	14·07	4,887,915,000	183,461	9·5
1928	60·00	5525	1·31	12·86	4,853,573,000	187,273	8·8
1929	56·49 (12·72 C.W.G.)	5210	0·39	12·49	4,893,783,000	188,020	9·4

Faulty meters include—Slow, non-registering, non-passing, oscillating.

All evidence seems to point to the fact that meter troubles have been accentuated by the presence of larger percentages of continuous vertical gas. Unfortunately the determinations of ammonia in the gas prior to 1925 were only determined intermittently. The ammonia content in itself does not influence the position, but serves as a guide to the efficiency of the washing plant, and the light oil content will increase with the inefficiency of this section of the works. During 1926 the efficiency of the washing plant was considerably increased; hence the comparatively low ammonia content of the gas during 1927, synchronizing with the lower number of faulty meters. I feel confident that this increased efficiency of the washing plant was one of the main contributing factors to the drop in the number of faulty meters during 1927.

Unaccounted-for Gas Due to Meter Troubles.

Obviously the next step was to ascertain if possible the quantity of unregistered gas due to faulty meters. In order to do this, several hundred meters were selected at random from twenty-six suburbs of Melbourne, tested, and examined. It would be both tedious and unwise to disclose the details of this investigation, but let it suffice to say that the impressions gained in the initial investigatory work were firmly placed beyond the realm of doubt.

A very conservative estimate of the unregistered gas passing through the consumers' meters is 3 p.ct., equivalent to 150 million c.ft. per annum. This figure does not include any unregistered gas due to taxing a meter beyond its capacity or through some of the mechanism being out of place due to indifferent handling.

Importance of Investigation to Small Works.

It has been our experience that meters within a radius of three miles of the works suffer more from light oil troubles than those more remote. Thus it seems highly probable that the engineer of a small works with a more limited distribution range is more prone to experience general meter troubles than an engineer whose distribution area is more extensive. Although this paper has been mostly concerned with the effect of these oils on the leather diaphragms, almost as important is their effect on the moving parts of the meters. Observations have permitted us to witness deposits of gum on the valve seatings, causing the valves to lift at every movement, allowing the gas to pass unregistered.

The evaporation of oils on the moving parts is more rapid than on the leathers or in the base of the meter, and thus deposits of gummy material are gradually built up, hindering the meter's efficient operation.

Methods of Preventing Meter Troubles.

(*a*) *Efficient Methods of Washing and Condensation.*—The evidence is fairly conclusive that Australian atmospheric conditions and Maitland coal demand greater consideration of washing and condensation plants than is considered necessary abroad. It is even possible that apparatus particularly suited to our conditions will have to be devised.

(*b*) *Avoid Low Temperatures in Retorts.*—As these deleterious unsaturated hydrocarbons are products of low-temperature zones, it is probable that their formation may be slightly minimized in the gas produced from the higher temperatures maintained in silica settings.

(*c*) *Effect of Gas Composition.*—The maintenance of a low oxygen content in the gas is advantageous, as in the presence of oxygen polymerization is greatly accentuated. The sulphur compounds contained in the gas do not in themselves influence the position greatly, but their oxidation products, which can readily be detected in moisture deposited in the mains and meters, together with HCN accelerate the velocity of polymerization.

(*d*) *Addition of Blue Water Gas.*—Blue water gas, being devoid of light oils, when blended with coal gas renders the resultant gas less saturated with light oils, and thus the quantity deposited will not be so great.

(*e*) *Introduction of Semi-Chrome Tanned Leather Diaphragms.*—At last year's meeting recommendations were put forward for the introduction of semi-chrome tanned leather diaphragms. We have conducted numerous experiments during the year in glass observation meters, and all data collected have served to show the wisdom of those recommendations. The chief virtue of semi-chrome tanned leather lies in the fact that it absorbs more dressing, loses the dressing more slowly, and once the dressing is removed it is far more resistant to the action of water.

(*f*) *Correct Selection of Leather Dressing.*—The perfect dressing would lubricate the leather, be insoluble in the light oil in the gas, and remain indefinitely unchanged. We have tried almond oil, olive oil, castor oil, paraffin oil, whale oil, and neat's-foot oil. The most suitable mixture we have found so far has been stolen from the more satisfactory constituents of the Sprague and Birmingham mixtures, and consists of equal parts of whale and neat's-foot oil, together with 6 oz. of paraffin wax per gallon. The choice of a suitable leather dressing, one which will lubricate and yet be insoluble in the light oil of the gas, is a problem presenting many difficulties. The manner in which we have attacked this problem is to dress the leather with the whale-neat's-foot oil dressing mentioned above and then coat this oiled diaphragm with an insoluble varnish. It is very difficult to procure a material that is insoluble in light oil, but we have found a few and are directing our attention to two—nitro-cellulose and Australian yacca gum. Both these, however, harden and crack, and to be effective must contain a plasticizer that will maintain the coating in a permanent state of plasticity. Many plasticizers have been tried, and the ones that have proved most successful so far are phthalic acid resin and naphthalene dichloride, and even they leave much to be desired.

(*g*) *Select Suitable Position for Consumer's Meter.*—A place should be selected where the minimum variation of temperature will result and where condensation of hydrocarbons will be at a minimum.

Proposed Avenues of Further Research.

(*a*) Careful observation of the composition of the light oil produced from silica settings compared with fireclay settings and from steamed and non-steamed installations.

(*b*) Relationship of water gas carburettor temperature with its light oil composition.

(*c*) To improve methods of washing and condensation.

(*d*) To investigate the industrial application of indene-styrene-cumarone resin.

(*e*) To investigate fully the properties of the higher homologues existing in tar.

(*f*) To endeavour to obtain a perfect leather dressing. The perfect leather dressing would not only be insoluble in the light oil, but would contain a plasticizer to prevent any resin formed from hardening.

Industrial Indene-Cumarone Resins.

In practice indene and cumarone are not separated, but the resin is prepared from the fraction of light oil boiling between 160°-185° C. by polymerization with sulphuric acid and subsequent distillation *in vacuo*. These resins are made in three grades depending upon the purpose for which they are required. Among the artificial resins they rank next in importance to the phenol-formaldehyde group, and they find their chief application in the paint and varnish industry.

Cumarone resins are used in the manufacture of rubber for motor tyres, heels, and hose pipes, where constant wear is experienced; also for the manufacture of linoleum, floor cloth, felts, and paper. Cumarone resin has a very high dielectric constant, being surpassed only by porcelain and gutta-percha.

We cannot have both the numberless and undisputed advantages of the continuous vertical retorts and the more stable and useful hydrocarbons of the older methods of carbonization. In the past, many annoying bye-products have experienced romantic rises to utility.

If we consider the tar in a manner similar to that in which we have considered the light oil in the gas, it then ceases to be merely a black viscous fluid consisting of hydrocarbons of varying boiling points, and becomes a heterogeneous group of compounds, some of which are capable of change to compounds possessing entirely different properties. Thus, viewed from this aspect, two tars of different origin may comply with the one specification as to their viscosity and distillation range, and yet their lasting qualities may differ considerably.

It is impossible to review even the small amount of work which we have done during the past eighteen months without realizing that the carbonization of high-volatile Maitland coal in continuous vertical retorts under Australian conditions presents certain problems that are purely local in character and call for the most serious consideration by the chemical engineers employed in the gas industry in this country.

Midland Junior Gas Association

Steam Generation in Gas-Works Practice

At a Meeting of this Association at the Birmingham Council House on Jan. 8, the following paper was read:

STEAM GENERATION IN GAS-WORKS PRACTICE.

By Major W. GREGSON, B.Sc. (Eng.), Assoc.M.Inst.C.E., A.M.I.Mech.E., F.Inst.F., &c.

It now appears to be normally accepted practice to provide for all gas-works power requirements by means of steam, for generating power by gas engines means using "saleable" town gas, whereas steam can be generated as a bye-product of the gas-making process.

The average reasonably-equipped gas-works requires from 800 to 1200 lbs. of steam per ton of coal carbonized, for power and process requirements; the higher figure takes into account the requirements of vertical retorts, for steaming purposes, and for additional mechanical plant.

Steam can be generated in two ways:

(*a*) By utilizing surplus heat from the retorts;

(*b*) By firing boilers with coke breeze.

At the present moment, a fair statement would be that in the majority of the larger and more modern works method (*a*) is adopted either fully or partially. The older works still rely on (*b*).

Turning for a moment to consider steam generated by surplus heat from retort settings, it is now an established fact that, owing to the limits of regeneration when firing settings with producer gas (due to the relatively low air volume compared with waste products), every type of retorting plant fired by hot producer gas is a suitable subject for practising economic waste-heat recovery by steam-raising, provided a proper system of fluework is used and that suitable boiler plant—designed for effective heat transmission at low temperature ranges, where almost all the heat is transferred by contact effect and not by radiation—is installed. The requirements of such a boiler are small over-all dimensions, to reduce radiation loss, no brick casing with resultant infiltration of air into the zones of negative pressure, and a heating surface arranged for the maximum possible molecular contact effect between gases and heating surface, coupled with reasonable fan-draught requirements.

SPENCER-BONECOURT BOILERS.

The high-velocity firetube boiler of the Spencer-Bonecourt type was designed and exploited to meet this set of fundamental requirements, and the almost universal adoption of this class of boiler by the gas industry in this country, the colonies, and abroad seems to show that it is fulfilling its mission.

In the case of regenerative horizontals, a figure of some 2½ lbs. of water (actual) can be evaporated per lb. of producer coke, and this gives a yield of approximately 840 to 1000 lbs. of steam per ton of coal carbonized.

This figure of 2½ lbs. per lb. of coke is easily obtainable, provided reasonable care is taken to avoid air leakage into the flues and regenerator system—thereby avoiding dilution of the gases *ex* regenerators.

On non-regenerative verticals, the steam yield is increased to an easy 4 lbs. per lb. of producer fuel; hence we get a steam yield of 1340 lbs. per ton of coal carbonized —*i.e.*, sufficient surplus over works requirements to handle retort steaming as well.

We thus arrive at the fact that any well-run gas-works can be self-contained on "waste-heat" steam alone for ordinary requirements. The exception is when additional (say) chemical plant has to be dealt with over and above the normal services appertaining to the usual exhausters, pumps, power for lifts, charging, handling and conveyor plant, and—in the case of verticals—steaming.

In this connection, it must be remembered that where water gas plants form part of the scheme, each individual plant becomes a self-contained unit for steam requirements when fitted with its own waste-heat boiler.

Now waste heat must be used *in situ* if it is to be of any use as a bye-product; hence it is surely sound economics to depend on this source of steam for works requirements, and see what can be done to eliminate the use of (*b*)—coke breeze—for works use and develop its sale as a marketable bye-product, owing to the fact that, unlike waste heat, it can be transported and stored.

COKE BREEZE.

Unfortunately, there is still a marked feeling in the gas industry that coke breeze is of little use as a saleable bye-product, and the author cannot help feeling—basing on his own observations—that this is due to the extremely poor steam-raising results obtained from coke breeze in the average gas-works. The attitude in many gas-works appears to be that of "Here we have a waste product; let us get rid of it as quickly as possible," and the boiler plant is rather looked upon as a coke-breeze destructor. Lancashire type boilers are generally used with air or steam forced draught, but the actual operating conditions are often extremely bad. Fuel is heaped on and the furnace then acts as a producer—with volumes of unburnt producer gas going up the chimney. Then occurs a short period of reasonable running, followed by thinning out of the fire with large volumes of excess air blown in and reducing the temperature; then the cycle is repeated. Now this is all very wrong when it is remembered that coke breeze is a smokeless fuel having a calorific value of 9000 to 10,000 B.Th.U. per lb. as fired—*i.e.*, equivalent on a heat basis to approximately 80 p.ct. that of good average boiler slack. Furthermore, if burnt properly, boiler efficiencies as high as those obtainable with coal can be maintained; and it is therefore a fuel which every gas engineer should exploit for use by his local industries—either for use alone, or mixed with (say) half bituminous slack.

Coke breeze is equally adaptable for "small" industries on the one hand as for power stations on the other, and there is not a gas-works in this country where the district does not afford an outlet for coke breeze exploitation—provided, of course, that the matter is tackled soundly and proper advice regarding details of combustion equipment and the operation thereof is given to the consumers. Furthermore, too much stress cannot be laid on the smokeless fuel aspect—whether fired alone or mixed with small coal.

The whole question is such a sound one economically that one cannot see why its use should be confined to practically the London district only. It must be realized that electrical competition is now really putting the gas industry on its mettle; and it is only by exploiting every conceivable bye-product of the carbonizing process to its full and proper use that this competiton can be effectually countered.

Whereas by proper manipulation coke breeze can be utilized very effectively on Lancashire boilers, the best results are undoubtedly obtained on water-tube boilers fitted with mechanical grates, as perfectly even combustion conditions can then be maintained without detailed attention. The Babcock boilers at the tar and ammonia works at Beckton give running efficiencies of over 80 p.ct. working on ordinary coke breeze *ex* Beckton Gas-Works.

Summing up, therefore, we see that coke breeze should only be used on the works when special steam requirements demand an excess over and above normal figures, as the latter can always be met by the effective utilization of the surplus heat in the retort firing gases and (in the case of water gas plants) by the use of the sensible heat in the "blow gases."

In the case of horizontals where dry coke quenching is resorted to, a further supply of steam is available by making use of the sensible heat in the hot coke. Owing to the high capital cost of such plant, however, for a gas-works installation, it is difficult to justify on the basis of waste-heat recovery alone—*i.e.*, the real fundamental question in handling this problem of dry quenching is the enhanced value of the resultant coke.

On smaller works, fitted with inefficient steam drives, the summer load often leads to a secondary problem, as the curve of steam requirements does not fall anything like *pro rata* with the throughput, and at these reduced loads the steam requirements of the works are excessive. In these cases lighting-up a coke-breeze boiler—with its attendance and maintenance—can be avoided by slightly over-firing the retort producers to give excess gas which, burning up excess air at the boiler intake, considerably increases the temperature of the gases entering the boiler with a very small increase in volume, and so augments the steam sup-

ply at very little extra fuel cost. On some plants, an extra producer has been added for this purpose, in order to avoid varied manipulation of the retort producers. This additional producer is charged in the ordinary way by the retort house labour and used for these special periods.

Efficient Steam Utilization.

Earlier in this paper, the writer gave general figures for steam requirements in the average well-run gas-works, but unfortunately there are works where requirements are considerably in excess of these figures. This is almost entirely due to bad transmission systems and uneconomical usage—based, of course, on the old idea of having a certain quantity of coke breeze to get rid of, and firing it away with no idea of cutting down the steam demand in the works by more efficient utilization thereof. It is no exaggeration to say that in a large proportion of our gas-works a little study of existing conditions and requirements and a little money judiciously spent would easily effect steam economies to the extent of some 20 p.ct. In the first place, a little more concentration of power plant—with reduction in steam mains—would greatly reduce condensation losses.

How many small pumps and engines does one see with water coming out of the exhaust? The steam consumption per H.P. on such prime movers must be appalling. Then again, in many cases where lay-out does not permit of reduction in length of steam mains, consider the great advantages which would accrue at the prime movers by merely supplying them with perfectly dry steam at the stop valves. This can easily be done by applying a little superheat at the boiler plant—quite a moderate figure, so as not to cause any trouble on old-type exhauster engines, &c. Then how many engines exhaust direct to atmosphere, discharging some 1000 B.Th.U. to the skies for every pound of steam used? An exhaust steam feed water heater is the obvious economy in this case—to supply the boiler plant with hot feed instead of cold or lukewarm water as so often occurs. For larger units, condensing, with resultant increased engine efficiency, is called for.

Another inherent source of waste in gas-works is the multiplicity of small steam-driven units. Surely a central generating set and electric distribution to motors is not an expensive engineering undertaking even for small works, when the resultant economies are taken into consideration? The author is quite often confronted by the gas engineer who refuses to entertain electricity in his works at all, looking upon such as "trading with the enemy." Surely, if he feels so strongly on the subject, his attitude should be that he has made his enemy his handmaiden, wherewith to reduce his cost of production? Again, when will engineers realize that, for process work, low-pressure steam is quite as effective as high-pressure steam? If temperature is required to speed up chemical action, then re-superheated exhaust steam meets the requirements, the re-superheating being carried out by the waste gases. For steaming vertical retorts, the author has always recommended the use of exhaust steam, taken at just sufficent pressure to avoid excessively large distribution mains. An alternative to purely exhaust steam is to "bleed" from (say) the compound generator engine receiver.

Lastly, in some works the steam load is a very uneven one—running up to peaks when (say) cargoes are being handled from ships or barges. Such loads can be evened out by the use of steam accumulator systems.

In presenting this short paper, the author would like to make it clear that nothing he has mentioned is by way of an experimental suggestion. Every individual idea mentioned can be seen in daily use, with due gain in economy in operation.

Prior to the discussion, the Chairman mentioned that three Diplomas had been awarded by the Institution of Gas Engineers in connection with the last examination, two of which had been won by members of the Midland Junior Gas Association; and he offered the congratulations of the members to Mr. R. L. Greaves (Wolverhampton) and Mr. D. Ward (Birmingham), the successful candidates.

Discussion.

The Chairman (Mr. W. MacNaughton), in calling upon Mr. J. H. Wainwright to propose a vote of thanks to the author, asked for some information regarding the use of exhaust steam from induced draught fan drives for water softening.

Mr. J. H. Wainwright (Halesowen), proposing the vote of thanks, asked for further details of coke quenching plants, and also if the amount of heat taken out by the "back-run" process on a water gas plant militated against a water gas plant being self-contained by way of steam.

Mr. E. Arthur (Nechells) seconded the vote of thanks. It was mentioned that it was difficult for medium size works to find a market for coke breeze, and it would appear easier to use it as a producer fuel. The speaker thought it difficult to use exhaust steam for steaming vertical retorts, owing to the variation in the supply of exhaust steam compared with that required for the carbonizing load.

Mr. F. Bengough (Nechells) asked for further details regarding the Spencer-Bonecourt method of cleaning waste-heat boiler tubes by means of chippings.

Mr. L. Thomas (Smethwick) stated that there was always difficulty in persuading manufacturers to use coke breeze as a fuel.

Mr. W. Shelley (Walsall) asked for information regarding the "N.O.C." process, and also for further experience regarding the use of water-tube waste-heat boilers. Did leaky retorts affect waste-heat boilers?

Major Gregson, replying to Mr. MacNaughton, stated that where water softening plant of the Neckar type was in use—*i.e.*, where heat was used to bring down the carbonates—this was an ideal way of utilizing the exhaust steam from the fan drives, thereby often eliminating the necessity for a separate heater. He regretted that lack of time prevented his giving further details regarding coke quenching plants; as it was, it was extremely difficult even briefly to skip over the main headings of the subject of the paper in the time allotted. Regarding the heat taken out by the "back-run" process, he believed he was correct in stating that it was still possible to handle the steaming requirements by means of the jacket *plus* waste-heat boilers incorporated in these plants.

Referring to the question of marketing coke breeze, as pointed out in the paper, this was a question for the distribution side, and where it had been pursued actively excellent results seemed to have been obtained and maintained; but first of all the gas engineer must make up his mind that coke breeze was a valuable bye-product, and act accordingly. In other words, half-hearted exploitation was of no use in tackling the consumer. The use of the exhaust steam for steaming verticals was rendered automatic by a suitable combination of reducing and live steam make-up valves.

Chippings were used for cleaning firetubes by insertion through a special hopper, the high velocity of the gases in transit through the boilers causing them (the chippings) to scrape the tubes before being charred. Eventually the chippings charred up at the outlet ends of the boilers and were ejected to atmosphere.

Referring to the points raised by Mr. Shelley, he (the author) believed that the "N.O.C." process was giving extreme satisfaction on the Spencer-Bonecourt boilers at Stretford Gas-Works. Regarding the use of water-tube waste-heat boilers, as pointed out in the paper the water-tube boiler was inherently a unit designed for the bulk of its heat transmission to take place by radiation, and where the radiation factor was so very low as maintained on most gas-works projects, the firetube boiler had inherent advantages. In addition to this advantage of type of heating surface, there was also the fact that the firetube boiler required no brick-setting or casing, the latter being sources of considerable maintenance trouble as plants got older. Furthermore, these casings had to be maintained in perfect condition, otherwise air got into the waste-heat boilers and cooled the gases, and so seriously affected the output. Regarding the matter of leaky retorts, this meant live gas burning in the flues, and the only effect was that full account was taken of the heat available to boost up the output of the waste-heat boiler.

Absorption of Water and the Prevention of Rust Formation by the Protective Coatings of Iron Pipes

By W. Beck, Kaiser-Wilhelm Institut für Physikalische und Elektrochemie, Berlin-Dahlem.

The examination of materials used for the protection of iron pipes against corrosion is often carried out by a method which, it is generally held, can be employed universally in the obtaining of quick and reliable information in regard to their protective properties—namely, by determining the electrical resistance. The methods, which have been published in technical literature, may not be readily available, and are therefore summarized below.

Haber and Goldschmidt[1] were the first to make tests on the lines indicated above. They surrounded a tarred piece of cast-iron pipe with a glass tube, one end of which was attached to the tube by means of rubber rings and iron cement. The tube contained a 5 p.ct. solution of zinc sulphate and a zinc rod as electrode. To the polished inner surface of the iron tube, a wire was attached, which was connected to a Wheatson bridge or the induction coil. Walker and Hickson[2] used, instead of this solution, a drop of an electrolyte.

K. H. Logan[3] developed a procedure in which the test piece was surrounded by a rubber sleeve of $\frac{1}{4}$ in. thickness. This was perforated by circular holes of 1 in. diameter, filled with moist earth, in which a wire electrode was inserted. Benson and Pollock[4] determined the electrical conductivity of painted steel plates. Junk[5] used in the test a metal brush of fine wires, which he passed over the painted test piece. While Haber[1] used A.C. current in order to avoid electrolysis, the American authors used D.C. current, and determined the electrical resistance from the tension and density of the current used in the test.

Beck and Jacobson[6] used A.C. current in the examination of iron pipes protected with " Schade " bandage. The electrode consisted of a bright metal ring, which could be moved parallel to the axis of the tube and tightened evenly in each position. Corresponding investigations of McCollum and Peters' can be regarded as standard tests. They were carried out with considerable care on materials which consisted of protective paints, bandages, and bituminous compounds into which the test pieces were dipped. A satisfactory and coherent protective coating was obtained by covering the inner surface of the hollow cone with the paint or bandage under examination. The cone, which was made of iron plate, was of small height, but possessed a base of large diameter, and was filled with tap water. Its apex was filled with solder and served as one of the electrodes in the test. Similar observations were made, in soil, on protected iron tubes carrying a certain electric potential. The results contained in the Report of the Corrosion of Pipes Sub-Committee of the Institution of Gas Engineers[8] were also obtained by determining the electric resistance of protected test pieces.

A somewhat different method was employed first by P. Herrmann. An electric cell was made, one pole of which consisted of a protected iron plate in a normal potassium chloride solution, while the other pole consisted of a " normal " calomel electrode. The electric potential was measured by means of the Pogendorff compensating method. If the protective coating does not absorb water, no E.M.F. develops, but when water is absorbed an electric potential is set up between the iron plate and the solution, the intensity of which depends on a number of factors. Instead of the non-polarizable calomel electrode, platinum foil or copper plate is sometimes used. The measurements are carried out by means of a sensitive voltmeter connected across the electrodes. Investigations on these lines were also undertaken by the Corrosion Sub-Committee[8] on protected iron tubes placed in tap water. Similar tests were made on protected iron tubes placed in soil and connected to a battery of a certain electric potential. The current density was determined from time to time.

The results of the examinations may be summarized as follows: Haber and his collaborators[1] ascertained that the electrical resistance, not only of freshly tarred cast-iron pipes, but also of those which had been in the soil for eight years, was very low. They attributed this to the numerous cracks in the tarred surface, which had been filled with electrolyte. Logan[3] investigated protected tube segments of different lengths and section, which were placed in soil. He also found that the electric insulating property of the protection was materially reduced after a few weeks. Beck and Jacobsohn[6] also observed, with pipes, protected with " Schade " bandage which were placed in highly corrosive electrolytes, that the initial high electrical resistance was reduced after a short time. McCollum and Peters[7] also confirmed that protective coatings develop a certain permeability for the electric current after more or less prolonged test periods. Herrmann[9] found that a number of paint films absorbed water after a short time, while others showed no difference after a fortnight.

Generally speaking, therefore, all protective coatings exposed to water or soil absorb water after a comparatively short time and become conductors for the electric current. It is to be borne in mind that even traces of water will increase the electrical conductivity sufficiently to be detected by the sensitive methods employed in the tests.

A number of investigators, in particular the Corrosion Sub-Committee, maintain that a material which is not a complete and permanent electric insulator cannot be regarded as an adequate protection against corrosion. It is the object of this article to investigate whether this opinion is justifiable.

A solid film may absorb water in two different ways—namely, (*a*) through the formation of cracks and fissures, and (*b*) by a colloidal process, which is known as " swelling." Both processes may occur simultaneously. In the case of tar and bituminous paints, which form a comparatively inelastic film, the formation of cracks has been proved through the corrosion of the test pieces. Haber[2], as well as McCollum and Peters[7], found local corrosion on the tubes after the removal of the protective film. Comparative investigations have shown that, under the same conditions, certain protective coatings develop an electrical conductivity sooner than others. Such observations can only serve as a general indication, and thus have a strictly limited value. Tests of long duration carried out under natural conditions cannot be replaced by this method. In this connection, it should be pointed out that the conclusion must not be drawn that a tube is protected against electrolytic corrosion when only a current of small density is passing. The current density[1] at the unprotected metal surface, which should be determined at as many places as possible, is the only criterion. The formation of cracks can also be observed in the case of pigments with an oil-base and so-called submarine protective paints, which give rise to phenomena of " swelling."

It is doubtful whether electrical measurements can be used for the examination of such coatings. The examination of protective paints, carried out according to Herrmann's method, usually produces results which are in direct opposition to practical experience[12]. Herrmann, for example, found that a paint unsuitable as a protective coating absorbed less water than one of proved value, and thus had a higher electrical resistance. Such findings can only be the result of employing a wrong method for determining the protective value of paints. Bitumen can only protect a metal surface when it covers it completely. This fact is wrongly applied to paints[8], whereby the rôle played by the pigment is completely ignored. The fallacy has been proved for some time. Prior to Herrmann, electrical measurements carried out by Ragg[13] showed that so-called submarine paints absorb water after a short time. Nevertheless, these films are capable of exerting a protective influence for many months. A similar observation was made by Liebreich[14] – [16] in connection with oil varnishes, while Eibner[17] pointed out that a dry paint film can serve as a water reservoir. Recently Wolff[18] has investigated the problem of water-resisting paints. Indeed, well-known protective paints develop their properties only after having absorbed moisture. In this connection, the chromate paints must be mentioned, the function of which depends on the formation of " pacifying " films. Also, the well-known Liebreich paints belong to this category, their protective action being caused through the splitting-up of an alkali. Similarly, the inhibiting effect of red lead oil paints can be explained[20].

Attention must be drawn to the reduction in the dissolution velocity of iron brought about by such paints, which contain pigments which are anodic towards the protected metal (aluminium and zinc). It is, therefore, immaterial whether the film of a rust-proof paint loses its electrical insulating properties after two days or in a fortnight. For the rapid determining of the protective properties, other methods must be adopted. It is hoped to publish a new method in the near future.

A third group of coverings—viz., those belonging to the type of the " Schade " bandage, will now be considered. This bandage, which is also called " Denso." consists of a cotton fabric which has been impregnated with a substance derived from the distillation of mineral oil, containing certain moisture-absorbing bodies such as aluminium hydrosilicates. The results of the electric conductivity deter-

minations have already been published[6]. After leaving the test pieces in acid mine water or sea water for six weeks, the bandage was removed. The examination of the metal surface, with a magnifying glass, revealed no attack whatsoever. Similar observations were made on pipes which had been buried in corrosive soils for three years, where other protective coatings had failed. It follows that the electrical resistance is not a measure of the protective properties of the " Schade " bandage, anti-corrosive properties of which have been amply demonstrated experimentally.

The mechanism underlying the process was not explained until recently, when experiments in colloidal solutions were undertaken by Beck and von Hessert[21 – 24], who threw light on this interesting problem. It was found that the inhibiting effect of colloids added to dilute saline and acid solutions depended on the nature, as well as on the concentration, of the added substances. Table I. contains a number of selected results.

TABLE I.

Concentration of Colloid	Reduction in Rate of Corrosion in Distilled Water Through the Addition of—				Time of Experiment.
	Agar-Agar.	Starch.	Silica Sol.	Gelatine.	
P.Ct.	P.Ct.	P.Ct.	P.Ct.	P.Ct.	
0·2	91·21	36·19	33·79	54	96 hours
0·1	..	38·11	43·16	61·23	,,
0·5	..	66	..	..	,,

It was shown that the reaction velocity was reduced by the formation of gel-like coagulation products on the surface of the solid phase. This must be regarded as an enveloping effect, and not as a process of adsorption.

Further experiments were made in regard to the adhesion of the different films to the surface, which, incidentally, offered no appreciable electric resistance. Electro-chemically the reduction of the dissolution velocity depends on a certain relationship between the formation of the films and the prevention of the normal electrical discharge of hydrogen ions on the electrode. It is, unfortunately, impossible to discuss these phenomena here in detail.

As a result of certain observations, the swollen matrix of the " Schade " bandage must be regarded as a colloid, and thus the mechanism of its protection against corrosion is explained by the colloidal theory referred to above. The superiority of the " Denso " bandage, as compared with other similar agents, depends mainly on its adhesive properties, which are added by the special fabric, and also on its chemical neutrality.

SUMMARY.

It was investigated whether the electrical insulating properties of protective coatings on iron tubes exposed to moisture can be used for the rapid determinations of their anti-corrosive properties. Tar, pitch paints, and inelastic bituminous materials can be examined by this method, which, however, can give no more than a general indication of the nature of the material. The method was applied to films of anti-corrosive paints and plastic coverings, and yielded results which are not in agreement with practical experience. A colloidal theory is developed, by means of which the mechanism of the protective action of the " Schade " bandage is explained.

REFERENCES.

1. F. Haber and F. Goldschmidt, Ztschr. fur Elektrochemie, **12**, 49, 1906.
2. P. H. Walker and E. F. Hickson, Bur. of Stand. Jour. of Research, **1**, 13, 1929.
3. K. H. Logan, Oil and Gas Jour., **27**, 33, 87, 90, 94, 1929.
4. H. K. Benson and C. Pollock, Ind. Eng. Chem., **3**, 670, 1911.
5. A. Junk, Ztschr. Angew. Chem., **38**, 9, 1925.
6. W. Beck and K. Jacobsohn, Ztschr. Korrosion und Metallschutz, **5**, 202, 1929.
7. B. McCollum and O. S. Peters, Tech. Papers Bur. of Stand., No. 75, 1914.
8. 1st Report of the Corr. of Pipes Sub-Committee, Inst. of Gas Engineers, London, 1930.
9. P. Herrmann, Zentralblatt der Bauverwaltung, **43**, No. 75-76, 1923.
10. K. Mertzger, Farbenzeitung, **30**, 2404, 1925.
11. O. Krohnke, E. Maass, and W. Beck, Korrosion Band I Leipzig, 1929, 92.
12. H. Wolff, Farbenzeitung, **30**, 1317, 1925.
13. M. Ragg, Die Schiffsboden und Rostschutzfarben, Berlin, 1925, 85.
14. E. Liebreich und F. Spitzer, Ztschr. fur Elektrochemie, **18**, 94, 1912.
15. E. Liebreich, Ztschr. ges. Kalte-Industrie, **20**, 74, 1913.
16. O. Krohnke, Uber Schutzahstriche eiserner Rohre, Leipzig, 1910.
17. A. Eibner, Uber Fette Ole, Munchen, 1922, 124, 161, 165.
18. H. Wolf, Farbenchemiker, **1**, 20, 1930.
19. E. Liebreich, Farbe und Lack, **30**, 163, 602, 1929.
20. E. Maass and E. Liebreich, Ztschr. Korrosion und Metallschutz, **6**, 178, 1930.
21. I. N. Friend, Trans. Chem. Soc., 119 (1), 932, 1921.
22. W. Beck, Ztschr. Korrosion und Metallschutz, **6**, 178, 1930.
23. W. Beck, ebenda, **6**, 230, 1930.
24. W. Beck and F. von Hessert will appear in the next issue of Ztschr. fur Elektrochemie.

Gas for Fish Frying

Suggested Co-operation Between Range Manufacturers and Gas Undertakings

An important meeting between fish range manufacturers and the Gas Light and Coke Company took place on Jan. 13 at the Company's premises at 146, Goswell Road, Clerkenwell, E.C. The meeting was inaugurated by Mr. Harold L. Langham, of the National Federation of Retail Fish Traders.

The party met at the Industrial Showrooms of the Company in Goswell Road, where a demonstration was given by Mr. W. Dieterichs, the Manager of the Industrial Workshops, and his assistants, who illustrated the differences in the construction of fish frying pans. He demonstrated the various pans in conjunction with different burners, explaining that greater efficiency was obtained through the use of heat absorbers on the bottom of the pans. The party were then conveyed to Watson House, Nine Elms Lane, Battersea, the Research and Training Section of the Company, where a conference was held, the chair being taken by Mr. STEPHEN LACEY, B.Sc., Deputy Controller of Gas Sales to the Company, supported by Mr. Langham.

Mr. LANGHAM said he thought that it was the first time a meeting of this description had been held since the fish frying industry had been recognized as such. He mentioned that there were 1200 fish caterers in the district covered by the Company, out of which only 183 were users of gas. This, he considered, indicated the need for industrial research. It was the question of economy that the fish fryer had in mind, and it was his opinion that gas would be the fuel of the future, but that if it was going to be dear, it would not be used. The cost of gas for an average fish fryer would work out at a higher average than would that of coal or coke. Of course, a great deal depended on whether the gas was used economically. He believed that in the North of England, where the Offensive Trades Order was in operation, there were more users of gas instead of coal or coke for fish frying. The Gas Light and Coke Company had carried out a great deal of experimental work, and with the co-operation of the fish range manufacturers they could probably extend this work. The Company did not desire to make ranges; they only wanted to sell gas. The field for experiments was vast, and the result of that meeting would probably be far-reaching in all parts of the kingdom. In his opinion the average fish fryer would pay a little more than the cost of coal or coke if he could obtain gas, which was undoubtedly cleaner. In many districts in England the trade of a fish fryer was declared an offensive trade, and in consequence the fish caterers had to comply with certain regulations of the Health Officers. Naturally, they had to modernize their plants in order to make their places of business very clean, and in nearly every place they were advised by the local Health Officers to use gas. The buying of a fish range involved a large outlay. Certain makers sold their ranges on the deferred payment system, and if the gas undertakings could sell ranges in this manner it would be a boon to the fish fryer.

Mr. DIETERICHS said that no doubt many of them would be surprised to hear that the actual thermal efficiency of six makes of ranges varied from 28 to 36 p.ct., which must be considered as rather low. The experiments that had been carried out that morning showing a considerable increase in thermal efficiency were by no means complete and many of the gentlemen present would no doubt be able to suggest even greater improvements. The thermal efficiency of the various burners was approximately the same. As far as they were concerned they used a well-known make of burner almost exclusively, which gave satisfactory results. If higher thermal efficiency was to be expected, they would have to look to the construction of the pan bottom and the combustion chamber, and not to the burner. Instead of asking for cheaper gas, it would be an advantage to increase the thermal efficiency. The experiment that morning had shown there had been a 20 p.ct. saving through using a pan fitted with heat absorbers. Many of them had no doubt considered the question of governors, and although they as a Company did their utmost to keep the pressure within reasonable limits there were cases when the pressure did alter and the use of a governor would be an advantage. The range manufacturers would be well advised to fit governors to their ranges. He would like them to regard the Company as assistants to them, and not as competitors. In many cases small defects occurred in some of the makers' ranges; and if they would only advise the Company they would only be too pleased to give them all the assistance they required to put the complaint right. He emphasized the

importance of correct ventilation, and stated that in his opinion a range, when being tested, should be capable of ventilating itself with a 2-ft. length of flue, and not necessarily be connected to a main flue to ensure correct ventilation. As far as external fluepipe was concerned in connection with fish ranges, he suggested that as a general rule range makers used mild steel (galvanized), but, in his opinion, it would be more satisfactory to use asbestos, as its life would be longer and the products would be warmer, as was desirable from the ventilation point of view.

Mr. ROBERT WILKINSON, of the Acme Engineering Company, was the next speaker. He remarked that, in regard to the ventilation of flues, they, as range makers, had to consider the question of steam. They therefore made their flues considerably larger than were required for the products of combustion, in order to cope with the steam. There was one point in regard to the Davis burner which he would like to bring forward. This was only made in three sizes, and in his opinion there should be a greater range of sizes to cope with the different sized pans. He thought that if the Davis Company increased the range of sizes of their burners it would induce many fish fryers to use gas. They had been trying to popularize gas, and his father had been successful in inducing the Leeds Corporation to give the fish fryers a considerable reduction, including them in the furnace rate. Electricity had come to the front slightly, and a new type of range burning coke had come rapidly to the front. He realized that electricity was not a commercial proposition as far as the majority of towns were concerned.

Mr. LACEY then announced the results which had just come to hand of a test which had been made at Goswell Road with a ¼-in. plate bottom pan as compared with ⅛-in. plate, which showed that the thermal efficiency was practically the same.

Mr. W. R. TWIGG, of the Davis Furnace Company, said that he was not a range maker, and he felt gratified at receiving the invitation to be present. He wanted them to realize that he was in exactly the same position as were the Gas Light and Coke Company. They were out to help the range makers, and it was only through co-operation that they could get anywhere. He would like to express his thanks to Mr. Wilkinson for the frank remarks he had made regarding the Davis burner. If the industry called for other sizes, they were prepared to extend the range of burners indefinitely. They were out to meet the requirements of the trade, and were not out to make the trade accept what they made. On the question of ventilation, he came between the range maker, the gas company, and the fish fryer. It was always a pleasure for them to send out to remedy any complaint that might exist, following their policy of supporting the range maker and the gas company. He strongly advised them to adopt Mr. Dieterichs' suggestion that they should test a range with a 2-ft. length of flue only, and not rely on a long flue satisfactorily to ventilate the range. In conclusion, he said he could not too strongly advise the use of a governor.

Mr. PROCTOR, of Messrs. E. W. Proctor, referred to the fact that a pan with heat absorbers would cost approximately £4 extra per pan, and he thought that one very important point had been missed, and that was the saving of oil or fat when using gas for frying purposes. In many cases, as far as his experience was concerned, it had been proved that the saving of oil had more than compensated for the additional cost when using gas. He stated that his firm made gas ranges only.

Following the meeting the party were entertained at luncheon at Watson House, at the conclusion of which the visitors were conducted round the laboratories and training shops of the Company at Watson House, where many items of interest were inspected. They were then conveyed to the Cookery and Food Exhibition, where the party visited the gas exhibit.

Parliamentary Intelligence.

[From Our Special Correspondents.]

House of Commons.

Private Bills.

The following Private Bills have been presented and read a first time: Aldershot Gas, Water, and District Lighting Bill; Guildford Gas and Electricity Bill; Sheffield Gas Bill; South Yorkshire Gas Network Bill. The Guildford and Sheffield Bills have been referred to the Examiners, and are put down for second reading on Jan. 27. The South Yorkshire Bill has also been put down for second reading on that date. The special resolution of the shareholders approving the Royston and Brodsworth Gas Bill has been deposited in accordance with Standing Order 72. This Bill is to be introduced in the House of Lords.

Special Orders.

Plans have been deposited in respect of the following Special Orders: Luton, Pontardulais, Stroud.

Metropolitan Gas Companies' Testings.

The Gas Referees' report of the official testings for the past quarter give the following average calorific values for the gas supplied by the Metropolitan Companies named.

Commercial Gas Company.—502·3 B.Th.U. (declared calorific value, 500 B.Th.U.).

Gas Light and Coke Company.—503·7 B.Th.U. (declared calorific value, 500 B.Th.U.).

South Metropolitan Gas Company.—561·6 B.Th.U. (declared calorific value, 560 B.Th.U.).

South Suburban Gas Company.—563·4 B.Th.U. (declared calorific value, 560 B.Th.U.).

Tottenham and District Gas Company.—501·5 B.Th.U. (declared calorific value, 500 B.Th.U.).

Wandsworth, Wimbledon, and Epsom District Gas Company.—471·8 B.Th.U. (declared calorific value, 470 B.Th.U.).

Gas Acts (1920 and 1929) Orders.

SPECIAL ORDER.

Luton Gas Company.

To authorize the Company to raise additional capital, and to make various financial provisions; to permit of the establishment of profit sharing; and to empower the Company by agreement to purchase gas-works, mains, pipes, and other works from any company or person supplying gas within the limits of the Company.

Register of Patents

Water Gas Generators.—No. 339,743.

HUMPHREYS & GLASGOW, LTD., of Westminster (Assignees of HAUG, J. S., of Philadelphia).

No. 33,504; Nov. 4, 1929. Convention date, Dec. 7, 1928.

The object of the invention is to provide an improved mechanical grate which will efficiently grind the clinker and eject the clinker and ash, and which will properly distribute the gas-making fluids to the fuel bed and serve as a means for leading off the down-run gas.

A generator having a water jacket and a rotary grate comprising a central ported tuyere, and a ribbed clinker grinding and ash ejecting base, is so constructed that the gas-making fluids will be introduced in a manner which will correct faulty distribution throughout the fuel bed, reduce the activity of combustion at the perimeter of the bed against the jacket wall, and make the central portion of the bed more active, and thus obtain a more uniform gas production over the cross section of the fuel bed as a whole and less extraction of heat from the fuel bed. To confine the introduction of the gas-making fluids for up-blasting and up-steaming to the central area of the fuel bed, the central tuyere is extended well into the fuel bed, and is formed throughout its entire surface with ports which are made large and unrestricted so as to afford an area substantially equal to, or larger than, the area of the opening in the bottom of the tuyere, and thus permit of the leading-off of down-run water gas without giving rise to substantial back pressure in the generator. The velocity effect which projects the blast toward the outer circumference is directly opposed to the object of this invention. The shape of the tuyere is such that the resistance to flow of gas-making fluids is equalized in all parts of the fire. It is made of substantially paraboloid form, so that in the centre, where the density of the fire is greatest, the depth of the fuel is least, and consequently the path of the gas-making fluids is shortest. As the porosity of the fuel increases towards the outer part of the fire, the path of the gas-making fluids is proportionately increased.

Gas Valves.—No. 339,819.

EBERT, E., of Horst-Emscher.

No. 130; Jan. 2, 1930.

The opening and closing of the valve body are effected by inclined surfaces provided on the cover of the valve casing and extending concentrically to the valve spindle, these inclined surfaces co-operating with rollers arranged on one or more cross heads on the valve spindle outside the valve casing, so that, on the valve spindle being rotated, the spindle, together with the valve cone or closing member of the valve on the spindle, will be raised or lowered. By this arrangement, states the patentee, an exceedingly simple construction capable of being manufactured at a low cost is obtained, the moving parts of which are all out of contact with the gases flowing through the valve and not exposed to any high temperature which may exist inside the valve. The casing of the valve is, moreover, simplified, and ready exchangeability of the moving parts is possible even when the valve is in use.

Aldershot Gas, Water, and District Lighting Company

Report of Annual Shareholders' Meeting, Jan. 26, 1931

The Annual Meeting of the Proprietors of the Aldershot Gas, Water, and District Lighting Company was held at Farnborough on Monday, Jan. 26—Mr. R. W. EDWARDS, J.P., Chairman and Managing Director, presiding.

The SECRETARY (Mr. F. A. Ricketts) read the notice convening the meeting, and after the minutes of the previous ordinary meeting and of an extraordinary meeting held in December last had been confirmed, the CHAIRMAN rose to move the adoption of the Directors' report and accounts for 1930.

The Directors' Report.

The Directors present a statement of the Company's accounts for the year ended Dec. 31, 1930, from which it will be seen that the revenue from all Departments was £248,772 0s. 9d. and the expenditure £192,881 18s. 1d., leaving a surplus of £55,890 2s. 8d.

After allowing for dividends on consolidated preference stock, interest paid to bank and on redeemable mortgage bonds and debenture stock, as well as for the statutory dividends paid for the half-year ended June 30, 1930, the Directors recommend the full statutory dividends of £6 1s. p.ct. per annum on the "A" stock; £4 11s. p.ct. per annum on the "B" stock; and £5 p.ct. per annum on the "C" stock, for the latter half of the year—all *less* income-tax.

The business of the Company generally has been satisfactory; gas and electricity both show better sales; coke and breeze increased revenue, while tar and sulphate of ammonia have suffered from adverse markets. Bulk water supply has been less owing to the wet summer.

Mr. Lionel Maltby, F.C.A. (of Messrs. Deloitte, Plender, Griffiths, & Co.), retires by rotation, and is willing to serve again if re-elected.

Mr. B. R. Green is the retiring Director, and being eligible, offers himself for re-election.

R. W. EDWARDS, Chairman.

Jan. 22, 1931.

Chairman's Address.

Addressing the shareholders, the CHAIRMAN said:

In submitting the Directors' report and accounts for the year 1930, I would venture, in the first place, to anticipate your permission to take the same as read.

Gas.

During the past seven years the sales of gas have advanced 44·4 p.ct.

The following is an extract from an authoritative article very recently published:

> It is a striking fact that the British gas industry is rapidly extending, in spite of the competition of electricity, and our annual production of gas is now 14 p.ct. above that of 1925, and 65 p.ct. larger than in 1910.

The corresponding figures of this Company are no less than 18 p.ct. and 85 p.ct. respectively.

For 1930 the sales (excluding supplies to our engines at pumping stations and generating stations) show a net increase of over 2½ p.ct. (2·55 p.ct.), and, having regard to the relatively high minimum night temperatures experienced during the past year, one can conceive a very appreciable reduction in gas consumption due to the curtailed use of heating apparatus.

To illustrate my point, I give you particulars of the monthly mean night temperatures (degrees Fahr.) for 1929 and 1930:

—	1929.	1930.	—	1929.	1930.
January	30·4	38·9	July	50·5	51·8
February	26·3	33·4	August	50·9	52·8
March	30·2	35·2	September	49·9	50·2
April	34·4	40·0	October	41·8	45·2
May	42·5	43·9	November	38·7	38·6
June	46·4	49·3	December	38·6	35·8

From these it will be observed that, with the exception of November (when there was but ·1 of a degree difference), December was the only month with a night temperature lower than 1929.

It will, I am sure, be accepted by the industry that gas consumption is becoming more and more subject to the vagaries of the weather, and when one notices the large number of gas fires which are fixed annually—in our own case over 1000 during 1930—any abnormal weather which will limit the use of this apparatus must reflect itself in the output.

The following apparatus was added during 1930:

Cookers	662
Fires	1002
Hot water	531

The amount received for residuals represented 56·7 p.ct. of the cost of coal, as compared with 60 p.ct. in 1929, 53·5 p.ct. in 1928, and 56·6 p.ct. in 1927.

Whilst coke and breeze yielded more revenue, tar and sulphate of ammonia had adverse markets to contend with.

The yield of liquid products, calculating for ammoniacal liquor of 8 oz. strength, was 47·4 gallons per ton of coal carbonized, as compared with 47·36 in 1929, 45·7 in 1928, and 43·7 for 1927.

Water.

This Department has been affected by the lower demand for water in bulk, owing to the almost continual rain during the summer months.

The total rainfall was, however, not so much in excess of 1929, being 28·93 in., against 26·91 in.

The year itself was not a good one, as the sunshine averaged but 4·21 hours per day, as against 4·97 in 1929, the total hours sunshine for the year 1930 being only 1536·65, against 1814·05 in 1929.

The average net consumption per head per day was 14·7 gallons, as compared with 14·5 gallons for 1929, 15·26 in 1928, and 15·79 in 1927.

These figures are really good, and reflect great credit on the inspectors' supervision.

The slight increase of ·2 of a gallon was entirely due to the increased domestic consumption during the month of June—the one dry month of 1930—when rain only fell on one day, yielding ·30 in.

Electricity.

This Department has achieved further development during 1930. The advance in sales, excluding consumptions on our various works, shows a net increase of 41·6 p.ct.

The following apparatus has been fixed during the past year:

Lamps	7085
Motors	37
Fires	398
Cooking apparatus	90
Sweepers	68
Irons	82
Miscellaneous	90

representing an additional load of 1533 kilowatts, as compared with an increase of 623 kilowatts in 1929.

The price for lighting, as well as for all other purposes, has been substantially reduced during the past year, which, of course, reflects itself in the accounts submitted.

Capital.

For the three undertakings the amount of capital authorized is £1,431,367 14s. 2d. Of this there has been received £980,390 5s. 7d. Adding a debit balance of £42,229 0s. 3d., we arrive at a total of £1,022,619 5s. 10d., from which £40,989 8s. 3d. (added on consolidation in 1909) is deducted to arrive at a net figure of £981,629 17s. 7d. After deducting depreciations of £10,010 18s. 4d., the net capital expenditure during the year was £35,471 11s. 11d.

General.

Rates are an increasing burden on the undertaking, and are the subject of serious concern.

I feel that the valuation of undertakings, which extend into more than one rating or assessment area, should be determined by a Special Tribunal, with powers to assess the undertaking as a whole. If this were done there is no doubt our rating problem would be eased.

During the year we have added a total of 3027 consumers, including the latest absorption, making an increase of 11,438 in seven years.

Co-Partnership.

This continues to be a satisfactory scheme. For the year ended June 30, 1930, the bonus was 8·3 p.ct., as compared with 6·5 p.ct. for the year ended June 30, 1929.

Long service awards were introduced on June 30, 1930, for employees of over 20 years' standing—26 have already benefited, with services ranging from 20 to 48 years.

The Sports Club and the Hospital and Benevolent Fund, in collaboration with the various hospitals and convalescent homes, have done excellent work during the year, respectively for the recreation of the employees and the relief of those who have been ill or injured.

The Directors pay full tribute to the principal officers—Chief Engineer, Secretary, Chief Accountant, and Solicitor, and to all officials and employees under them in their respective Departments, for the devotion and zeal which has been given to the Company in the execution of their duties.

Generally, the outlook is good, for, fortunately, the Company has a very wide area over which its business is being developed.

In conclusion, I now formally move the following resolution, which I will ask the Deputy-Chairman, Mr. T. A. Braddock, to second:—

> That the Directors' report, with the statement of accounts for the twelve months ended Dec. 31, 1930, be and are hereby adopted, and that the dividends as therein recommended be and are hereby declared to be forthwith payable to the proprietors.

This was agreed to.

GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

The Stock Exchange closed on Friday last with a cheerful tons in most departments. The gilt-edged section was particularly active, and it is gratifying to note that numerous industrial issues showed welcome signs of recovery.

Gas stocks and shares more than maintained the strength of a week ago, and a further large number of issues showed improvements. The chief among these was a rise of 7½d. in Gas Light £1 units to 20s.-20s. 6d., and a gain of 5 points to 345-365 in Imperial Continental ordinary. It will be noticed from the Stock and Share List that debenture stocks continue to strengthen; last week's best being that of Bournemouth 4 p.ct. with an increase of 4 points to 81-84.

The first batch of dividend announcements for the past half-year have been made, and the following actual rates on ordinary stocks are recommended:

—	Dividend.	Corresponding Dividend.	Year. 1930.	Year. 1929.
	P.Ct.	P.Ct.	P.Ct.	P.Ct.
Gas Light . . .	Half year, £2 16s.	£2 16s.	£5 12s.	£5 12s.
South Metropolitan	Final, 3¾	3¾	6½	6½
Commercial . .	Half year, 3	3	6	6
Tottenham . . .	,, ,, £3 6s. 3d.	£3 6s. 3d.	£6 12s. 6d.	£6 12s. 6d.

The report and accounts of the Aldershot Gas, Water, and District Lighting Company for the past year have been received and show satisfactory results. The balance of the three revenue accounts was £55,890, against £60,428 for 1929. After providing for interest charges, preference dividend, and the statutory dividends paid for the June half-year, the Directors recommend the full statutory dividends of £6 1s. p.ct. per annum on the "A" stock, £4 11s. p.ct. per annum on the "B" stock, and £5 p.ct. per annum on the "C" stock for the December half-year, leaving £6998 (against £6451) to be carried forward. Fresh capital is now required to cope with the rapid expansion of business, and the Company are offering for sale by tender 4 p.ct. consolidated preference stock to produce the net sum of £150,000 at a minimum price of £74 10s. per £100 stock, yielding at this figure £5 7s. 4d. p.ct. The last day for receipt of tenders is Feb. 3.

Current Sales of Gas Products.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Jan.* 26.

The values of tar products are as follows:

Pitch, 45s. per ton f.o.b.

Creosote, for export, 5¼d. to 5¾d. per gallon f.o.b.

Pure toluole, 1s. 11d. to 2s. per gallon; pure benzole, about 1s. 8d. per gallon; 95/160 solvent naphtha, about 1s. 5d. per gallon; pyridine bases, about 3s. 6d. to 3s. 9d. per gallon.

All prices of spirits are *ex* sellers' works.

Tar Products in the Provinces.

Jan. 26.

The average prices of gas-works products during the week were: Gas-works tar, 18s. 6d. to 22s. 6d. Pitch—East Coast; 43s. to 43s. 6d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 43s. to 43s. 6d. f.o.b.* Toluole, naked, North, 1s. 6¾d. to 1s. 7¼d. Coal-tar crude naphtha, in bulk, North, 9d. to 10d. Solvent naphtha, naked, North, 1s. 2½d. to 1s. 3d. Heavy naphtha, North, 11d. to 1s. Creosote, in bulk, North, liquid and salty, 3⅜d. to 3⅝d.; low gravity, 1⅜d.; Scotland, 3⅜d. to 3⅝d. Heavy oils, in bulk, North, 5⅜d. to 5⅞d. Carbolic acid, 60's, 1s. 2d. to 1s. 2½d. Naphthalene, £10 to £12. Salts, £3 to £5, bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port, it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Jan.* 24.

With few exceptions distillers are finding it difficult to dispose of their products. While the volume of business has increased to some extent, prices realized are extremely low.

Pitch.—Shipments from this area are very small. Values are unchanged at 42s. 6d. to 45s. per ton f.o.b. Glasgow for export, and about 42s. 6d. per ton f.o.r. works for home trade.

Refined tar to Ministry of Transport Specification continues to be offered at 2¾d. to 3d. per gallon f.o.r. works in buyers' packages.

Creosote.—Some large contracts for timber preservation have now been placed. B.E.S.A. Specification prices are 2¾d. to 3d. per gallon; low gravity, 3¼d. to 3½d. per gallon; and neutral oil, 3d. to 3¼d. per gall—all f.o.r. in bulk.

Cresylic.—Conditions remain quiet, with stocks high. Pale, 97/99 p.ct., is 1s. 6d. to 1s. 7d. per gallon; dark, 97/99 p.ct., 1s. 5d. to 1s. 6d. per gallon; and pale, 99/100 p.ct., 1s. 8d. to 1s. 9d. per gallon—all *ex* works naked.

Crude naphtha.—Available supplies command 4d. to 4½d. per gallon f.o.r. in bulk.

Solvent naphtha.—90/160 grade is now quoted at 1s. 2½d. to 1s. 3½d. per gallon, but 90/190 is unchanged at 1s. to 1s. 0½d. per gallon.

Motor benzole.—Business is dull, and value is about 1s. 4d. per gallon *ex* works.

Pyridines remain unchanged. 90/160 is nominal at 3s. to 3s. 3d. per gallon.

Benzole Prices.

The following are considered to be the market prices at the present time:

	s. d.		s. d.	
Crude benzole	0 7½	to	0 8½	per gallon at works
Motor ,, ...	1 3	,,	1 4	,, ,, ,,
Pure ,, ...	1 7¾	,,	1 8¼	,, ,, ,,

Trade Notes.

Jeffrey-Diamond Portable Conveyors.

In a recently issued leaflet, Messrs. British Jeffrey-Diamond, Ltd., of Stennard Works, Wakefield, give ten reasons why their portable belt conveyor is ideally suitable for handling coal, coke, cinders, refuse, oxides, sand, &c. Illustrations are shown of the 30-ft. conveyor at work at two well-known gas-works.

Keith Blackman Dust Exhausters.

Messrs. James Keith & Blackman Company, Ltd., of 27, Farringdon Avenue, E.C. 4, have recently published a leaflet describing and illustrating some of their wood refuse, metal dust, and fume removal plants. These have been designed, manufactured, and installed by the firm for exhausting wood refuse from saws, multicutter planers, and other woodworking machinery; metal dust from grinding machines, polishing spindles, and rumblers; and the dangerous fumes from interior paint spraying operations.

New Capital Issues.

Aldershot Gas Company.—The Aldershot Gas, Water, and District Lighting Company are offering for sale by tender sufficient 4 p.ct. consolidated preference stock to produce the net sum of £150,000 at a minimum price of issue of £47 10s. per £100 stock. Tenders must be in multiples of £5, and the smallest amount which may be tendered for is £20. Tenders should be received not later than Feb. 3. Further particulars are given in our advertisement columns.

Bilston Gas Company.—As will be seen from our advertisement columns, Messrs. A. & W. Richards, of 37, Walbrook, E.C. 4, are offering for sale by tender, on behalf of the Directors of the Bilston Gas Light and Coke Company, £20,000 5½ p.ct. redeemable debenture stock (to be redeemed at par on Sept. 30, 1950) at a minimum price of issue of par. The minimum amount of stock which may be tendered for is £50; above this tenders may be in amounts and multiples of £5. Tenders must be received not later than 11 a.m. on Tuesday, Feb. 3.

Contracts Advertised To-Day.

Coke Breaking, &c., Plant.

The Gas Committee of the Manchester Corporation invite tenders for the supply and erection of coke breaking, screening, and washing plant, &c. [Advert. on p. 223.]

Retorts.

The Gas Committee of the Loughborough Corporation invite tenders for the renewal of retorts. [Advert. on p. 223.]

The Gas Department of the Clacton-on-Sea Urban District Council invite tenders for the re-setting of retorts. [Advert. on p. 223.]

Tar.

The Directors of the Slough Gas and Coke Company invite tenders for their surplus tar. [Advert. on p. 224.]

STOCK AND SHARE LIST.

[For Stock Market Report, see earlier pages.]

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Jan. 28.	Rise or Fall on Week.	Transact'ns Lowest and Highest Prices During the Week.
£			% p.a.	% p.a.				
171,978	Stk.	Aug. 14	5	5	Aldershot 5 p.c. max. C. .	78—78	..	..
923,992	,,	,,	4	4	Do. 4 p.c. Pref. . .	73—76	..	..
1,551,868	,,	Oct. 9	7⅞	7⅞	Alliance & Dublin Ord. . .	100—105	..	102
374,000	,,	Jan. 8	4	4	Do. 4 p.c. Deb. . . .	70—75	..	..
922,655	,,	Aug. 28	7	7	Barnet Ord. 7 p.c. . . .	109—112	+1	110
300,000	1	Oct. 23	1/4½	1/7½	Bombay, Ltd.	15/6 - 17/6	..	..
174,500	10	Aug. 14	9	9	Bournemouth 5 p.c. . . .	14½—15½	..	..
500,050	10	,,	7	7	Do. 3 7 p.c. . . .	12½—13	..	..
439,160	10	,,	6	6	Do. Pref. 6 p.c. .	11—11½	..	..
50,000	Stk.	Dec. 18	3	3	Do. 3 p.c. Deb. .	60 - 63	+2	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb. .	81—84	+4	83—83½
357,900	,,	Aug. 28	7½	7½	Brighton & Hove 6 p.c. Con	112 - 117	..	115—116
971,880	,,	,,	6½	6½	Do. 5 p.c. Con.	102—105	..	..
1,287,500	,,	July 24	5	5	Bristol 5 p.c. max.	93 - 95a	..	..
855,000	,,	Sept. 25	8	7	British Ord.	109 - 114	..	112½
100,000	,,	Dec. 18	7	7	Do. 7 p.c. Pref.	103—114	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. . .	74—77	..	..
450 000	,,	,,	5	5	Do. 5 p.c. Red. Deb. . .	95 - 99	..	..
100,000	,,	Jan. 8	5	5	Cambridge 5 p.c. Deb. . .	95 - 98	..	..
100,000	10	Dec. 4	10	6	Cape Town, Ltd.	8⅝—9⅜	..	..
100,000	10	Nov. 6	4½	4½	Do. 4½ p.c. Pref. . .	6½—7½	..	..
150,000	Stk.	Dec. 18	4½	4½	Do. 4½ p.c. Deb. . .	70 - 75	..	..
626,860	,,	July 24	6	6	Cardiff Con. Ord.	95—98	..	..
287,860	,,	Jan. 8	7½	7½	Do. 7½ p.c. Red. Deb. .	97 - 100	..	..
157,150	,,	Aug. 14	5½	5	Chester 5 p.c. Ord. . . .	86 - 91b	..	..
98,986	1	Oct. 9	†2/-	†2/-	Colombo, Ltd. Ord. . . .	32/—34/-	..	..
24,500	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. .	18/—20/-	..	..
609,204	1	Oct. 9	1/9⅜	1/4½	Colonial Gas Assn. Ld. Ord	16/6—18/6	..	..
296,053	1	,,	1/7½	1/7½	Do. 8 p.c. Pref.	18/—20/-	..	..
2,078,280	Stk.	July 24	7	6	Commercial Ord.	95 - 98	..	97½
475,000	,,	D c. 18	3	3	Do. 3 p.c. Deb. . .	57—60	..	58
787,560	,,	Aug. 14	7	7	Croydon sliding scale . .	106 - 109	..	107½—108½
453,100	,,	,,	5	5	Do. max. div. . . .	83—86	..	85—86
542,270	,,	Aug. 14	10	7	Derby Con.	115—125e	..	..
55,000	,,	Dec. 18	4	4	Do. Deb.	65 - 70e	..	..
209,000	,,	Aug. 28	5	5	East Hull Ord. 5 p.c. . . .	72—75	..	..
1,002,180	,,	Sept. 25	†7g	†4	European, Ltd.	100 - 110	..	100—103
18,629,125	,,	July 24	5⅜	5⅜	Gas Light & Coke 4 p.c. Ord.	20/—20/6f	+·/7	19/6 - 20/3⅜
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max. . . .	63½ - 65½	..	65
4,167,020	,,	,,	4	4	Do. 4 p.c. Con. Pref. . .	79 - 82	..	81—82
5,502,620	,,	Dec. 18	3	3	Do. 3 p.c. Con. Deb. . .	61—64	..	62½—63¼
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. . .	100—103	+1	102½—103
161,480	,,	Sept. 11	10	10	Harrogate Cons. 10 p.c. max.	157—162	+2	161
82,500	,,	Aug. 28	7	7	Hastings & St. L. 5 p.c. Conv.	98 - 103	..	98 - 100
268,740	,,	,,	5½	5½	Do. 3½ p.c. Con v.	82 - 85	+2	83½—85
70,000	10	Oct. 9	½	10	Hongkong & China, Ltd. .	13 - 14	..	..
218,200	Stk.	Aug. 14	6	6	Hornsey Con. 3½ p.c. . .	88 - 91	..	..
2,436,594	,,	Nov. 6	25	15	Imperial Continental Cap. .	345 - 365	+5	347—355
223,180	,,	Aug. 14	3½	3½	Do. 3½ p.c. Red. Deb.	80 - 85	..	..
235,242	,,	Aug. 14	8½	8½	Lea Bridge 5 p.c. Ord. . .	127—132	..	..
2,145,907	,,	Aug. 14	6	6	Liverpool 5 p.c. Ord. . . .	97 - 98b	+1	..
600,000	,,	Sept. 25	7	7	Do. 7 p.c. Red. Pref. .	99—101b	..	..
165,786	,,	Aug. 28	8	9	Maidstone 5 p.c. Cap. . .	123 - 128	..	..
63,480	,,	Dec. 18	3	3	Do. 3 p.c. Deb. . .	54 - 57	..	..
75,000	5	Dec. 4	†10	†10	Malta & Mediterranean . .	5⅝ - 6¼	+1/16	6—6 1/32
392,000	—	Oct. 1	5½	5½	Metrop'itan (of Melbourne) 5½ p.c. Red. Deb. . . .	88 - 91	..	..
675,000	Stk.	Nov. 20	†8	†6	Montevideo, Ltd.	95 - 105	..	..
2,061,315	,,	July 24	5½	5	Newcastle & Gateshead Con.	18/—18/6d/	..	..
682,856	,,	,,	4	4	Do. 4 p.c. Pref. . .	73—74d	..	..
691,705	,,	Jan. 8	3½	3½	Do. 3½ p.c. Deb. . .	67½—68¼d	+1⅛	..
277,285	,,	Nov. 5	5	5	Do. 5 p c. Red. Deb.	98 - 100d	..	..
169,940	,,	Aug. 28	7½	7½	North Middlesex 6 p.c. Con.	115 - 120	..	..
396,160	,,	Aug. 14	5	5	Northampton 5 p.c. max. .	76 - 81	..	..
300,000	,,	Nov. 20	7	9	Oriental, Ltd.	104—109	..	..
60,000	5	13 My., '15	—	—	Ottoman	0—¼	..	..
205,163	Stk.	Dec. 18	8	8	Plym'th & Stonehouse 5 p.c.	107 - 112	..	..
424,416	,,	Aug. 28	8	8	Portsm'th Con. Stk. 4 p.c. Std	115 - 120	..	..
241,446	,,	,,	5	5	Do. 5 p.c. max. . .	80 - 88	..	..
686,312	Stk.	Jan. 22	4	4	Primitiva 4 p.c. Rd. Db. 1911	82 - 85*	−1	..
389,813	,,	Dec. 18	4	4	Do. 4 p.c. Cons. Deb.	83—86	..	..
150,000	10	Sept. 25	6	6	San Paulo 6 p.c. Pref. . .	8½ - 8¾	..	..
1,736,968	Stk.	Aug. 28	6½	6½	Sheffield Cons.	105 - 107e	..	..
95,000	,,	Jan. 8	4	4	Do. 4 p.c. Deb.	77—79e	+1	..
90,000	10	June 5	‡4	‡5	South African	4—6	..	..
6,709,895	Stk.	Aug. 14	7½	5	South Met. Ord.	105—108	..	105½—107
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	113—116	+1	114½—115½
1,996,445	,,	Jan. 8	3	3	Do. 3 p.c. Deb. . .	60—63	+1	..
734,000	,,	Sept. 11	6½	6½	Do. 5½ p.c. Red. Db.	99—102	..	101
91,500	,,	Aug. 14	8½	8½	South Shields Con. . . .	109—110d	..	..
1,848,795	,,	July 24	6½	6½	South Suburban Ord. 5 p.c.	102—105	..	103⅜
468,827	,,	Dec. 18	5	5	Do. 5 p.c. Deb.	99—102	..	101½
647,740	,,	Aug. 28	5	5	Southampton Ord. 5 p.c. max.	75—78	..	..
121,275	,,	Dec. 18	4	4	Do. 4 p.c. Deb.	75—78	..	74—77
179,014	,,	July 24	8	8	Sutton Ord.	120—130	..	..
94,500	,,	Jan. 8	5	5	Do. 5 p.c. Deb. . . .	96—99	..	..
350,000	,,	Aug. 28	7	7	Swansea 7 p.c. Red. Pref. .	98—101	..	..
200,000	,,	Dec. 18	6½	6½	Do. 6½ p.c. Red. Deb. .	100—103	..	..
1,078,490	,,	July 24	6⅝	6⅝	Tottenham District Ord. .	103 - 107	..	105½
150,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. . .	102—105	..	..
199,005	,,	Dec. 18	4	4	Do. 4 p.c. Deb. . .	77—80	..	79
86,701	,,	Sept. 25	6	6	Tuscan, Ltd., 6 p.c. Red. Db.	74—79	..	76—78
309,094	,,	Aug. 28	7	7	Uxbridge, Maidenhead, & Wycombe 5 p.c. . . .	97—103	..	..
88,330	,,	,,	5	5	Do. 5 p.c. pref. . .	90—95	..	..
1,180,970	,,	July 10	—	7	Wandsworth, Wimbledon, and Epsom Cons. . .	112—115	..	113½—114½
200,000	,,	,,	5	5	Do. 5 p.c. Pref.	96—98	..	..
488,344	,,	Dec. 18	5	5	Do. 5 p.c. Deb.	100—103	+1	100—102⅝

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of stock. *g.*—Paid on £10 Shares. * Ex. div. † Paid free of income-tax. ‡ For year. § Div. = 10 p.c. p.a. less tax and less tax on interim dividend.

GENERAL
IMMERSION
Indirect Water Heater

Unique and Different

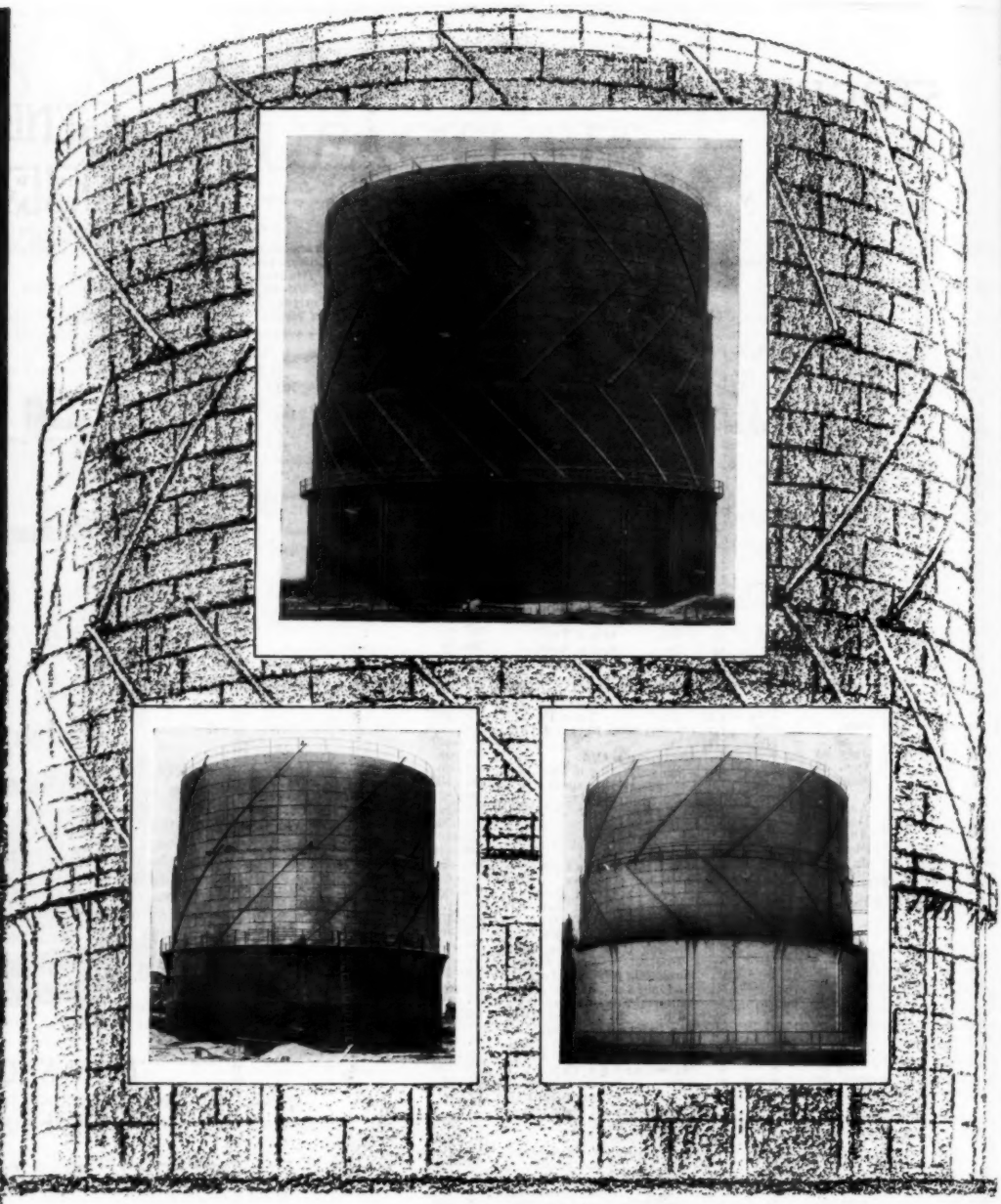
Adoption means Progress

THE SECRET OF A CHEAP & ABUNDANT SUPPLY of HOT WATER

LOW INITIAL COST
LOW INSTALLATION COST
MINIMUM GAS CONSUMPTION
NEGLIGIBLE MAINTENANCE COSTS
HARD AND SOFT WATER TROUBLES DISAPPEAR
NO DISCOLORATION OF WATER
NO CORROSION OF INTERNAL FLUES
NO CONDENSATION
NO DEPOSITS IN FLUES OR BOILER
WORKS INDEPENDENTLY OR IN CONJUNCTION WITH THE RANGE BOILER

GENERAL GAS APPLIANCES LIMITED
Gaude Bridge Manchester

GASHOLDERS



The latest and most modern methods of Gasholder construction.
We guarantee the highest class workmanship and materials in our structures.

Specify the "Vulcan" Ball-thrust Spiral Carriages on your next installation.
Automatic lubrication. Two and Four-wheel type to meet all needs.
Absolutely the last word in smooth working, strength and stability.

Sole Makers of the "Woodall-Duckham" Patent Gasholder Inlet Pipe.
Ensures perfect mixture.

FIRTH BLAKELEY, SONS & CO. LIMITED

GAS ENGINEERS AND CONTRACTORS
VULCAN IRONWORKS, CHURCH FENTON, YORKS.

Telephone: No. 14 SOUTH MILFORD

On Admiralty and War Office Lists.

Telegrams: BLAKELEYS, CHURCH FENTON
Code: BENTLEYS.

CONTENTS

EDITORIAL NOTES.

A GLANCE AT THE CONTENTS . . . 255
In the Middle of the Window 256
The Joint Gas Conference 256
Accounts of the Gas Light and Coke Company 257
South Metropolitan Gas Company's Working 257
The Call to Economy 258
Competition 259

Personal 259
Obituary 259
Forthcoming Engagements 259

CORRESPONDENCE.

Hampering a Vigorous Industry 260
The Electricity Campaign: Housing Estates and Gas 260
"Pushing Electricity" 260
Waste-Heat Recovery from Horizontals . . 261

THE NEWS OF THE WEEK.

Four New Purifiers at Belfast—Mr. R. J. Milbourne, J.P.—Success of the "All-Gas" Demonstration House at Bristol—Institution of Welding Engineers 262
Joint Gas Conference at the Fair—Official Programme 263
Cornish Association of Gas Managers—Annual Meeting 263

THE NEWS OF THE WEEK—(*continued*).

Report of the Directors of the Gas Light and Coke Company 263
Report of the Directors of the South Metropolitan Gas Company 263
British Coal Sold at Below Cost Price—Dr. Lessing on Coal Cleaning 264
Gas Industry Refused a Hearing 264
Hampering the Gas Industry 264
Mr. Lister Cooper Explains the Situation . 265
Mr. A. M. Paddon Addresses Lea Bridge Co-Partners 265
Official Partiality—A Co-Partner's Protest . 265
The Forthcoming Ideal Home Exhibition . 265
Westminster City Council and Gas Light and Coke Company's Bill 265
Use of Electricity Enforced on Scarborough Tenants 266
Co-Partnership Entertainments at Hastings . 266
Co-Operation with Builders and Architects . 266
Fuel Research Coal Survey 266
International Conference of Benzole Producers 267

PARLIAMENTARY INTELLIGENCE.

House of Lords—
Private Bills 267
House of Commons—
Private Bills 267

LEGAL INTELLIGENCE.

Compensation Claim Against Worcester Company 267

Service at Smethwick—New Showrooms Opened by Sir Arthur Duckham . . . 268
Fatal Gasholder Accident in Copenhagen . 269
In Continental Countries—Abstract Translations from the Technical Press of France and Germany 270

THE "JOURNAL" TECHNICAL RECORD.

London and Southern District Junior Gas Association—
Incomplete Combustion: Its Importance, Recognition, and Prevention. By E. W. B. Dunning, B.Sc., A.I.C. 271
Country Gas-Works Management. By C. E. Taylor 277
Aspects of Electricity Competition. By A. E. Hutchison 278
Scottish Junior Gas Association (Western District)—
Continuous Verticals. By W. A. Currie . 280

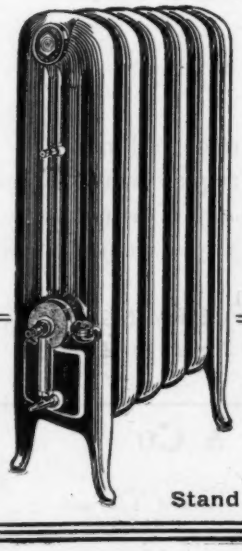
GAS MARKETS AND MANUFACTURES.

Stock Market Report 282
Current Sales of Gas Products 282
New Capital Issues 282
Contracts Advertised To-Day 282
Trade Notes 282

Stock and Share List 283

"JOURNAL" Telephone: Central 2236-7 (2 lines) | For Advertisers' Index—see p. 284

GAS-FIRED
STEAM RADIATORS
Made in 3 sizes
4, 6, 8 Loops
ATTRACTIVE
SAFE CLEAN
ODOURLESS NOISELESS



GENERAL

The
COMPACT SYSTEM
for
ALL CLASSES OF BUILDINGS

Both types of Radiator are fitted with automatic gas regulator, thus eliminating personal attention.

Plain design, free of ornamentation, and without dust pockets.

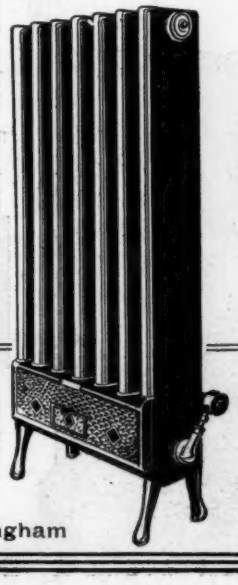
Clear floor space under loops for cleaning and dusting.

Ample space between loops for cleaning and ensuring free passage of air over the heated surface, therefore giving maximum efficiency.

Illustrated leaflets on application to:—

GENERAL GAS APPLIANCES LIMITED
GUIDE BRIDGE, MANCHESTER

GAS-FIRED
NONSTEAM RADIATORS
Made in 3 sizes
5, 7, 9 Loops
COMPACT
EASILY HANDLED
QUICKLY INSTALLED



Stand No. 11F/2 British Industries Fair, 1931, Birmingham

FIGURES TELL ONLY PART OF THE STORY

But the reliability of the index mechanism is vital.

Our original indexes were made by the watchmakers of Old Clerkenwell. Their descendants in making to-day's indexes still carry on the traditions which made the name of Clerkenwell so famous.

BRITISH INDUSTRIES FAIR, BIRMINGHAM

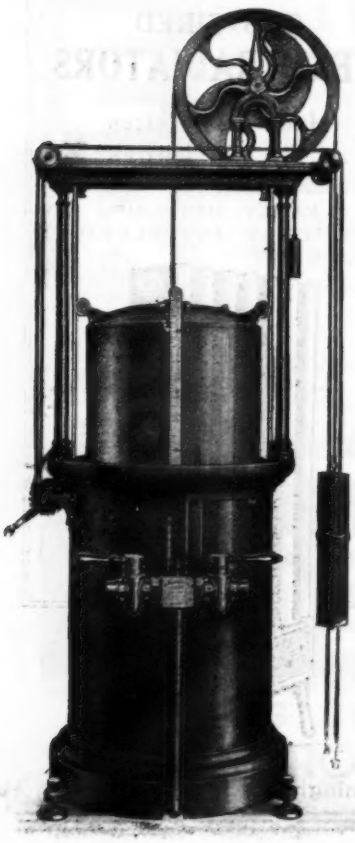
Feb. 16 - 27.

THOMAS GLOVER & CO. LTD.

Original Dry Meter Makers : Established in 1844.

Gothic Works : EDMONTON : LONDON : N18 : 8 Branches.

STAND No. 11 E.



PARKINSON'S

TEST GAS HOLDERS.

Constructed and fitted up in accordance with Board of Trade requirements. Every appliance for Meter Testing. Full particulars on application.

BRITISH INDUSTRIES FAIR, BIRMINGHAM

: : See our Exhibit—Stand 12 F 1 & 2 : :

W. PARKINSON & CO.

INCORPORATED IN PARKINSON & COWAN (GAS METERS), LTD.

Cottage Lane, City Rd., LONDON, E.C.1.	Bell Barn Road, BIRMINGHAM.	Raphael St., Cromac St., BELFAST.
'Grams:—"Index 'Phone London."	"Gasmeters Birmingham."	"Prepayment Belfast."
'Phone Nos.:—4270 Clerkenwell.	2245 Midland Birmingham.	3374 Belfast.